Message Center for DirectTalk®

IBM

General Information and Planning

Version 6 Release 4

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IBM

Note: Before using this information and the product it supports, read the information under "Notices" on page 73.

Contents

About this book

IBM Message Center for DirectTalk: General Information and Planning introduces you to unified messaging in general, describes the many functions of IBM Message Center for DirectTalk, and gives you the information you need to get ready to start using it.

IBM Message Center for DirectTalk is an application that runs on IBM DirectTalk for AIX® Version 2 Release 2

Throughout this book, we refer to IBM Message Center for DirectTalk as **Message Center**. We refer to all IBM DirectTalk for AIX system as **DirectTalk**, except where we need to distinguish between particular releases of the product.

Note: You may know IBM DirectTalk for AIX Version 2 Release 2 as Corepoint Voice Response Version 2 Release 2, a name by which it used to be known. Both names refer to the same product.

Who should read this book

This book is for anyone who wants to know about Message Center, and particularly for those preparing to install and operate it.

If you're just reading this book to get familiar with Message Center and what it can do for your business, you don't need to know much about unified messaging applications or the voice processing systems on which they run. However, if you're using this book as a first step to installing and operating a Message Center system, you need to be familiar with AIX for use on the RS/6000® computer and DirectTalk. You also need a basic knowledge of telephony and an understanding of the connectivity of your switch.

How to use this book

This book contains background information for completing tasks using Message Center. This background information explains when to use the procedures and contains prerequisites for using them successfully.

The tasks and procedures are described in the *IBM Message Center for DirectTalk: Administrator's Guide.* Use this book to give you the knowledge you need to move on to that book.

Typographical conventions

This book uses the following typographical conventions:

boldface italics
　　　　are used for emphasis. ***Take extra care*** wherever you see bold italics!

italics　　identify one of the following:

* New *terms* that describe Message Center components or concepts. A term printed in italics is usually followed by its definition, or has a definition in the glossary.

about this book

- References to other books.

Where to find more information

Apart from this book and the associated Message Center books, your main source of information is likely to be the DirectTalk library.

Message Center

The books in the Message Center library are available in Adobe Acrobat format for viewing online. Acrobat format is also known as Portable Document Format (PDF). You can read these books using the Acrobat Reader (or in a Web browser with the Acrobat Reader as a plug-in) available from Adobe Systems.

You can find the Acrobat versions of the Message Center books from our Web site at `http://www.ibm.com/software/`. Follow the link to Enterprise Products and then to Message Center

All the books are available in PDF format; only this *General Information and Planning* book is available as a printed book.

- *IBM Message Center for DirectTalk: General Information and Planning*, GC34-5521
- *IBM Message Center for DirectTalk: Administrator's Guide*, SC34-5488
- *IBM Message Center for DirectTalk: Subscriber's Guide*, SC34-5681

DirectTalk base software

- *DirectTalk for AIX: General Information and Planning*, GC33-1840
- *DirectTalk for AIX: User Interface Guide*, SC33-1841
- *DirectTalk for AIX: Installation*, GC33-1842
- *DirectTalk for AIX: Configuring the System*, SC33-1843
- *DirectTalk for AIX: Managing and Monitoring the System*, SC33-1844
- *DirectTalk for AIX: Designing and Managing Applications*, SC33-1845
- *DirectTalk for AIX: State Tables, Prompts, and Voice Segments*, SC33-1846
- *DirectTalk for AIX: Custom Servers*, SC33-1847
- *DirectTalk for AIX: 3270 Servers*, SC33-1848
- *DirectTalk for AIX: Problem Determination*, GC33-1849

IBM hardware for use with DirectTalk

- *IBM Digital Trunk Quad Adapter: Installation and Service Guide,* SY33-2119 (DTQA)

DirectTalk optional features

- *DirectTalk for AIX: GeoTel Custom Server User's Guide*, SC34-5317
- *DirectTalk for AIX: Programming for the ADSI Feature*, SC34-5380
- *DirectTalk for AIX: Programming for the Signalling Interface*, SC33-1851
- *DirectTalk for AIX: ViaVoice Speech Technologies for AIX*, SC33-1851

DirectTalk related products

- *DirectTalk for AIX: Digit Speech Recognition*, SC34-5690

Making comments on this book

If you especially like or dislike anything about this book, feel free to send us your comments. You can comment on what you regard as specific errors or omissions, and on the accuracy, organization, subject matter, or completeness of this book. Please limit your comments to the information in this book only and the way in which the information is presented. Speak to your IBM representative if you have suggestions about the product itself.

When you send us comments, you grant to IBM a nonexclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

You can get your comments to us quickly by sending an e-mail to idrcf@hursley.ibm.com

Chapter 1. Introducing Message Center

Message Center uses DirectTalk's *voice processing* capabilities to help you manage a wide range of voice mail, fax, and e-mail functions.

We tend to think of Message Center voice mail systems just as glorified answering machines, collecting messages for people when they can't answer the phone. But Message Center offers you much more than that, up to and including a fully integrated system that lets you access and process voice, fax, **and** e-mail messages.

The second chapter of this book tells you about Message Center users, the functions available to them, and the support they need. Chapter 3 tells you what you need to know to plan and prepare for providing Message Center. The *IBM Message Center for DirectTalk: Administrator's Guide* tells you how to install, tailor (or customize), and operate Message Center.

This chapter discusses some of the ways in which you can use Message Center. We start with an overview of how Message Center helps you get your communications media under control. We then look at the environment in which Message Center operates. We look at the different types of service you can provide with Message Center, from a basic voice mail system, all the way to a system that integrates voice, fax, and e-mail messages. Finally, we look in more detail at the functions that make up Message Center.

Message Center: managing the communications muddle

We live and work in a world rich in communications media. Mobile phones, answer-phones, voice mail systems, e-mail, pagers, fax, personal digital assistants, message services...the list seems endless. The reality of today's high pressure society is that people want instant communication, instant answers, mobility, and total flexibility. But do all these communications devices make it easier to communicate, or more difficult?

Message Center can help you make the diversity work to your advantage. It provides a central service that coordinates and provides access to all communications formats through the interface that is most appropriate to you at the time. Message Center frees the caller from needing to know the devices you have with you, and it frees the subscriber to use the most convenient communications medium for access.

At the heart of Message Center is the *message store*. This store acts as a repository for the different possible formats of message, including voice messages, stored in a highly compressed form, and e-mail and fax messages.

Physically, the store is not a single repository, but a set of separate, but connected, mechanisms. This ensures that the performance of the voice services is not delayed by concurrent activity with large, content-rich e-mail attachments.

1

managing the communications muddle

You manage your messages (whatever the format) through a single, consistent set of interfaces. These interfaces include the telephone, e-mail, and the World Wide Web. Message management includes general features such as message forwarding, message deletion, and message response, as well as personal features such as private directories.

Once a message (in whatever format) has been stored, Message Center can generate a notification. The subscriber can select the format of the notification, which may include e-mail, voice, pager, short message service (SMS) interfaces, or the message waiting indicator on a telephone handset.

As a subscriber, once you know that you have a message, you can select how you receive it. Your choices depend on the source message type, and the options installed on your system. In general terms, however, you can get your messages through the telephone, your e-mail system, or a Web interface.

What's new in IBM Message Center for DirectTalk Version 6 Release 4

There are a number of new functional enhancements in IBM Message Center for DirectTalk Version 6 Release 4. These include the following:

- **POP3 Support**. We now support access to e-mail located on POP3 E-mail Servers. Subscribers are now able to listen to their e-mail over text-to-speech when dialling in over the telephone as well as view their e-mail over the World Wide Web. This is in addition to our existing support for e-mail residing on IMAP4 e-mail servers. See "Listening to e-mail messages" on page 27

- **LDAP Support**. Subscribers can now use an LDAP server when performing the following functions:
  - Filtering e-mail messages
  - Composing and sending a voice message
  - Replying to a voice or e-mail messages
  - Forwarding a voice or e-mail message.

- **Telephony Portal**. Message Center subscribers can be set-up to enable them to receive and retrieve messages via the telephone without requiring mailboxes on Message Center. For users of this type, all voice fax and e-mail messages are located on the e-mail sever and all the details of the user's profile are retrieved from an LDAP server. See "Telephony Portal" on page 21

- **Brooktrout FAX card support**. To fax enable mailboxes on the system it is necessary to choose a Fax Server Solution. We have enabled IBM Message Center for DirectTalk version 6.4 to work with the Brooktrout TR114 Fax Card. This optional fax solution supports sending and receiving faxes in .TIFF/F format.

- **Enhanced Web functionality**. In IBM Message Center for DirectTalk Version 6.4 we have extended the functionality subscribers can use over the World wide Web.
  - Subscribers can reply to voice, fax and e-mail messages from the Web interface, provided that the address for replying is a valid internet address.
  - Subscribers can also forward voice, fax or e-mail messages from the web interface.

– Subscribers can directly add a sender of a message to his/her personal directory directly and can address messages using entries retrieved from the subscriber's personal directory or information on an LDAP server.

• **WAP Interface**. Subscribers can now access Message Center through our WAP Interface. They can view e-mail over the WAP interface and change the mailbox preferences by navigating through the WAP menu.

• **NLS support**. IBM Message Center for DirectTalk version 6.4 has been translated to support a variety of language options. The Message Center MCIT administration tool, voice segments, voice prompts, Web interface, WAP interface and documentation are now available in French, German, Italian, Japanese, Korean, UK English, US English.

• **Additional Security Measures** New security measures have been added for this release including:

– The prevention of passwords from being reused within a specific time period

– The restricted access to confidential e-mail being read via text-to-speech over the telephone.

• **Easier Installation and Upgrades**. All Message Center configuration settings have been moved from within source code to an external configuration file. This makes both initial installations and later upgrades of software much easier.

The Message Center environment

Message Center runs as an application on the DirectTalk voice processing system. Voice processing lets you bring together your telephone and data communications networks to access information stored in databases directly from a telephone.

The DirectTalk voice processing system comprises:

• The IBM DirectTalk for AIX *licensed program product*

• One or more RS/6000s

• Specialized hardware for the RS/6000 to communicate with the telephone network

The type of specialized hardware you need depends on the RS/6000 you're using, as follows:

• With a *PCI-based RS/6000*, you can use up to three:

– *Digital Trunk Quad Adapters* (*DTQA*s) installed in the system unit, together with one or more 9291 or 9295 digital trunk processors connected to the telephony network

• *ARTIC960RxD Quad Digital Trunk PCI Adapters* (known in Message Center as *Digital Trunk Extended Adapters* or *DTXA*s) installed in the system unit, and connected directly to the telephony network

• With a Micro Channel® RS/6000, you can use up to three Digital Trunk Adapters (DTAs) or Digital Trunk Dual Adapters (DTDAs) installed in the system unit and connected to the telephony network through a 9291 or 9295

Message Center environment

Figure 1 shows the possible configurations.
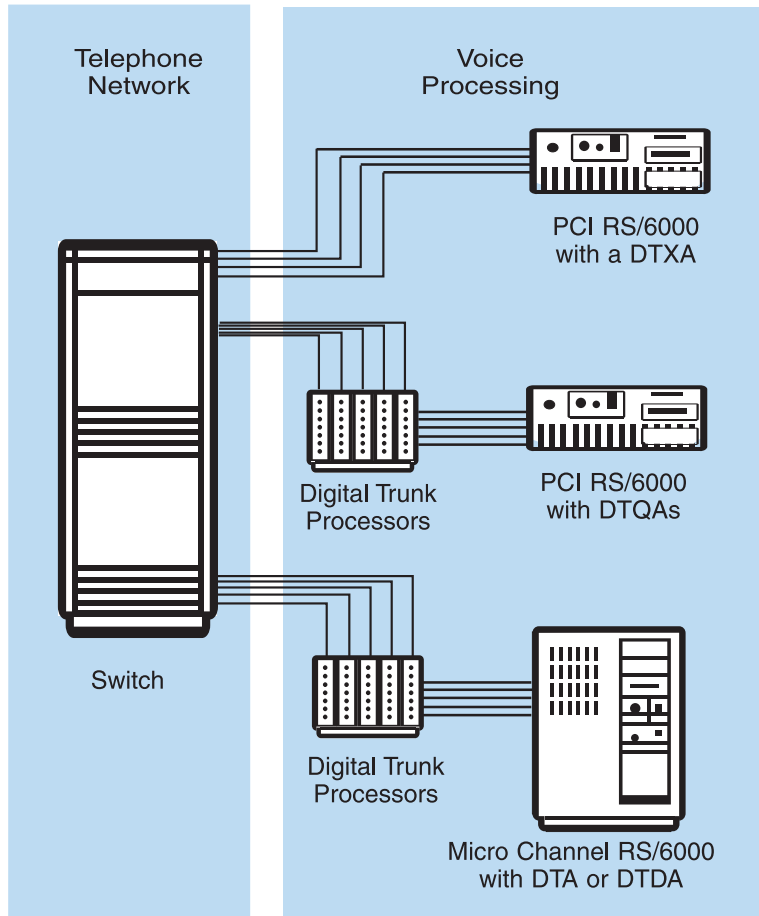
Figure 1. Digital trunk processor and DTXA connections

DirectTalk is connected to *caller*s through the telephone network, and to information in databases through the data communications network.

DirectTalk is an *application enabler*. It provides the capabilities people need to create their own voice applications: answering or initiating phone calls, accessing local or remote databases, playing voice responses to customers, and so on.

Message Center's voice mail services

Message Center helps you make better use of your time by letting you send and receive voice messages when personal intervention isn't necessary. You can record *personal greetings* that callers hear when you're not available, and Message Center takes any messages they leave for you to deal with when it's convenient to you.

Provided that your switch and telephony environment can support them, Message Center has all the capabilities described in the *IBM Message Center for DirectTalk: Subscriber's Guide*. Some subscribers will use Message Center simply as an answer-phone; others will want to take advantage of its many other capabilities.

Message Center as a transaction messaging system

Because Message Center runs under DirectTalk, it can interface to other DirectTalk voice applications to provide a voice messaging capability linked to other business transactions carried out over the telephone.

For example, a caller using a telephone banking system to complete a financial transaction might want to leave a message containing special instructions. Message Center can take such messages and link them to the caller's bank account number. Staff at the bank can then use Message Center to access the messages and deal with them.

Message Center as an integrated mail system

Message Center is not just an off-the-shelf voice mail application. You can customize it to integrate it with e-mail and fax mail servers to provide a complete messaging system for your enterprise.

Fast and efficient communications are a crucial part of today's competitive business environment, as demonstrated by the rapid growth of e-mail and fax communications. People now have an increasing number of mailboxes (e-mail, fax, and voice mail) that they must monitor, with the result that many important messages may remain unopened for a long time.

In an ideal integrated mail system, people want to be able to access all their mail, when they want to, and in the way that they want to. Naturally, Message Center lets its users access mail using the telephone. But, in the growing world of e-business, it also lets you provide a visual interface for Internet users to work with their voice, fax, and e-mail messages from a World Wide Web page. It's an exciting and powerful alternative to the normal telephone key pad method.

Subscribers and callers

Before moving on to look at Message Center's capabilities, we need to look briefly at a concept that lies at its heart: the difference between *subscribers* and *callers*.

Subscribers

Subscribers are people who own a mailbox on your system. They can use all the voice mail functions you have chosen to make available on your system, from simple answering machine functions, all the way up to fax and e-mail message handling.

Message Center environment

Subscribers can purchase different levels of service. These *subscriber types* are **Standard**, **Business - local**, **Business - local & remote**, **Remote e-mail only**, and **Residential**. Each type offers a different combination of features, as described below.

Callers In the context of Message Center, callers are people who might leave messages for your subscribers.

Subscriber types

Message Center lets you define five different types of subscribers. *IBM Message Center for DirectTalk: Subscriber's Guide* describes in detail the facilities available to each type, and they are summarized in Table 1 on page 7.

The subscriber types are:

Standard

A standard (or default) Message Center subscriber has access to a range of voice and fax capabilities.

(**Standard** Message Center subscribers have a similar set of functions, available from a similar set of menus, to those available to all subscribers in IBM DirectTalkMail.)

Business - local

Subscribers of this type have similar functions to standard subscribers, but with some minor differences, including named greetings and dynamic caller menus.

Business - local & remote

Subscribers of this type are identical to **Business - local** subscribers, but with the added ability to access e-mail messages that reside on a remote IMAP4-compliant or POP 3-compliant e-mail server.

Remote e-mail only

Subscribers of this type do not have access to any voice or fax messaging features. They have access only to their e-mail messages residing on a remote IMAP4 or POP3-compliant e-mail server.

Residential

Subscribers of this type have a simplified interface that allows them to receive voice messages only and to record one greeting. They do not have the full feature set available to the other subscriber types.

For each type of subscriber, the administrator can define different:

- Menus available to subscribers
- Menus available to callers to those subscribers
- Control menu functions available to callers or subscribers

Table 1 below shows the different features available to each subscriber type.

Table 1. Features available to subscriber types

	Standard	Business - local	Business - local & remote	Residential	Remote e-mail only
Receive voice mail messages	Yes	Yes	Yes	Yes	No
Receive local faxes (fax server needed)	Yes	Yes	Yes	No	No
Receive local e-mail messages	Yes	Yes	Yes	No	No
Retrieve remote e-mail messages	No	No	Yes	No	Yes
Have multiple greetings	Yes	Yes	Yes	No	No
Set preferences using Web page	Yes	Yes	Yes	Yes	Yes
Access local messages using Web page	Yes	Yes	Yes	Yes	No
Access remote e-mail messages using Web page	No	No	Yes	No	No
Maintain personal directory	No	No	Yes	No	Yes

Note: In all the descriptions of Message Center capabilities that follow, assume the **Standard** subscriber type, unless stated otherwise.

Besides the various subscriber types defined above, Message Center allows the system administrator to give subscribers voice mail access without the burden of maintaining subscribers within Message Center. All the necessary subscriber profile information is stored in a LDAP server. If subscribers are configured this way, all their voice messages are forwarded to an IMAP4 or POP3 compliant e-mail server. The subscribers can then retrieve the voice and e-mail messages from this e-mail server. These subscribers are referred to as **Telephony Portal** subscribers.

Message Center: responding flexibly to your needs

By tailoring Message Center, you can offer your users everything from a basic voice mail system to a complete unified messaging system. In this section, we'll describe various combinations of mailbox you can use to meet your needs for voice, fax, and e-mail message handling.

responding flexibly to your needs

Of course, what you can do depends on what type of Message Center you've purchased. You order Message Center, and receive a license for using it, according to how many mailboxes you want. You can also select the level of mailbox option you want:

1. Messaging mailbox (the basic version of Message Center)
2. Fax mailbox enablement (adds fax handling)
3. E-mail mailbox enablement (adds IMAP4 and POP3-compliant e-mail handling)

For each fax or e-mail option you want, you need a messaging mailbox.

In the sections that follow, starting at "The elements in designing a Message Center system" below, we give you an idea of the range of options available in all flavors of Message Center.

The elements in designing a Message Center system

Figure 2 on page 9 shows the three areas involved in any Message Center system: the inputs from callers, a means of storing those inputs, and reception of those inputs by subscribers.

Callers

Subscribers

Telephone

Telephone   Fax

Fax

Messaging
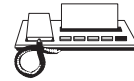
Web Access

WAP Access

E-mail

E-mail Access

Figure 2. The elements of a Message Center system

You start your design with the callers, and the information that they will leave: one or all of voice messages, fax messages, and e-mail messages

Once you know what will be left, you'll know what systems you need to store that information. Then you need to decide how your subscribers will access the information. As Figure 2 shows, there are three ways available: the telephone (optionally including a fax machine), the World Wide Web, and your e-mail system.

If your caller input is limited, one means of access may be enough. For example, if all that your subscribers receive are voice messages, telephone access might be enough. Alternatively, if callers have all methods available, you might want to unify on one subscriber access method. You can, for example, use the Web to access all message types. You might also provide your subscribers with alternatives. For example, they might usually use the telephone for voice, but have the ability to use the Web for all types.

Of course, the technology drives some of these decisions. You can't listen to e-mails without text-to-speech; you can't currently listen to fax at all.
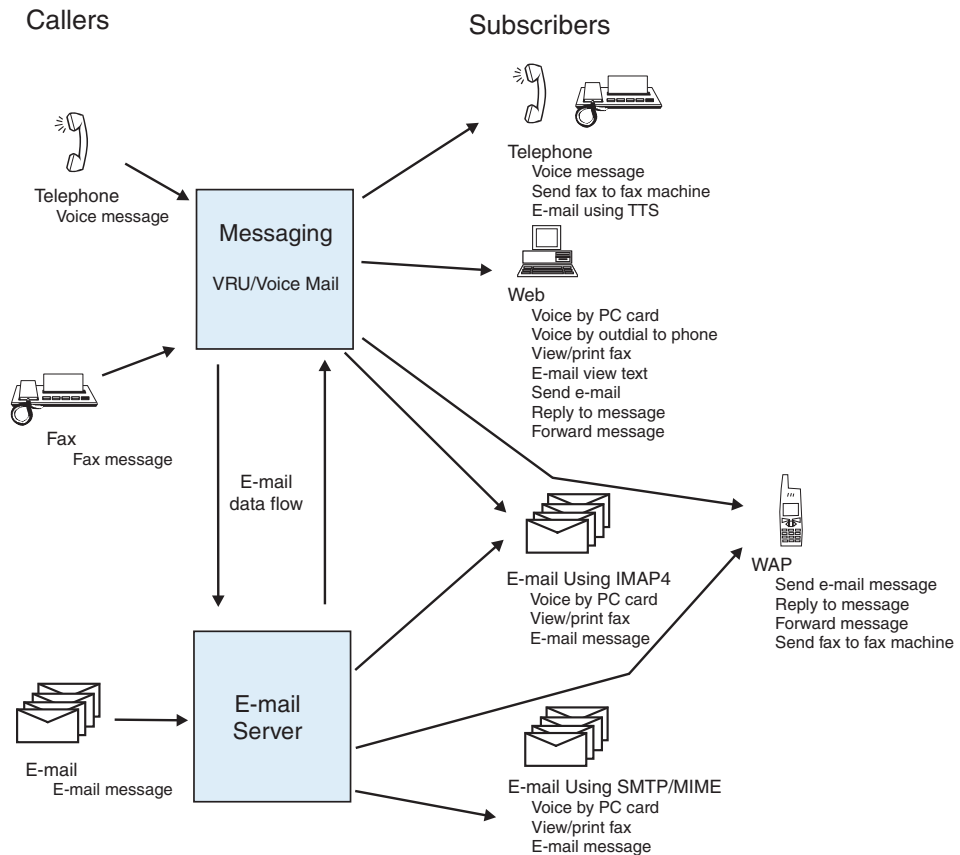
Figure 3. How the elements of a Message Center system fit together

Let's start in the middle with the data storage. In this example, we have voice mail and e-mail stored on separate servers. Fax mail can be stored on either system. We don't show a separate fax mail server because, in the Message Center environment, it is used as a sending and receiving mechanism, not as a storage system.

Note that the servers are linked. This enables us to manage the different types of data efficiently, while presenting what appears to be a single source to the subscribers.

Remember, deciding how best to store the data depends on:
1. Your business requirements (and those of your customers)
2. The underlying technology

The technology should always serve your business needs.

Let's turn now to your subscribers, and what could be available to them. As shown in Figure 3, the range of possible options is very wide:

Using the telephone, they could:

* Listen to voice messages
* Print faxes on a fax machine
* Listen to e-mail, using text-to-speech.

Using a Web browser, they could:

* Listen to voice messages in the form of .wav files using a PC audio card
* Listen to voice messages by using the system to dial out to the subscriber
* Display faxes on the screen using a fax viewer and print them on a local printer
* Display e-mail text
* Send e-mail text
* Reply to messages
* Forward messages

Using an e-mail system, they could:

* Listen to voice messages in the form of .wav files using a PC audio card
* Display faxes on the screen using a TIFF viewer and print them directly on a local printer
* Display e-mail text.

Using a WAP device, they could:

* Send e-mail text
* Reply to messages
* Forward messages
* Print fax on a fax machine.

Again, what you provide from this range depends on your business needs, and the technology you have in place to meet those needs. You could, for example, separate subscribers' access to phone and fax messages from their e-mail. They would need an ID on each system. Alternatively, you could allow them access to everything from the Web. In that case, they'd need only one logon ID.

Different mailbox combinations

This section describes the types of voice mail systems you can provide using Message Center:

* "Basic voice mail system"
* "Voice messaging system" on page 13
* "Integrating voice, fax, and e-mail messaging systems" on page 17

Basic voice mail system

You can easily configure Message Center to work just as an efficient answering service which records and plays back voice messages left in response to subscriber greetings.

responding flexibly to your needs

Figure 4 on page 13 shows a basic voice mail system, allowing subscribers to record, play back, and manage messages.

Note: In Figure 4 on page 13, and in the three figures following it, we use a simple convention to show communication between Message Center and its users:

shows users communicating with Message Center.

shows Message Center communicating with users.

Arrows in both directions means two-way communication.
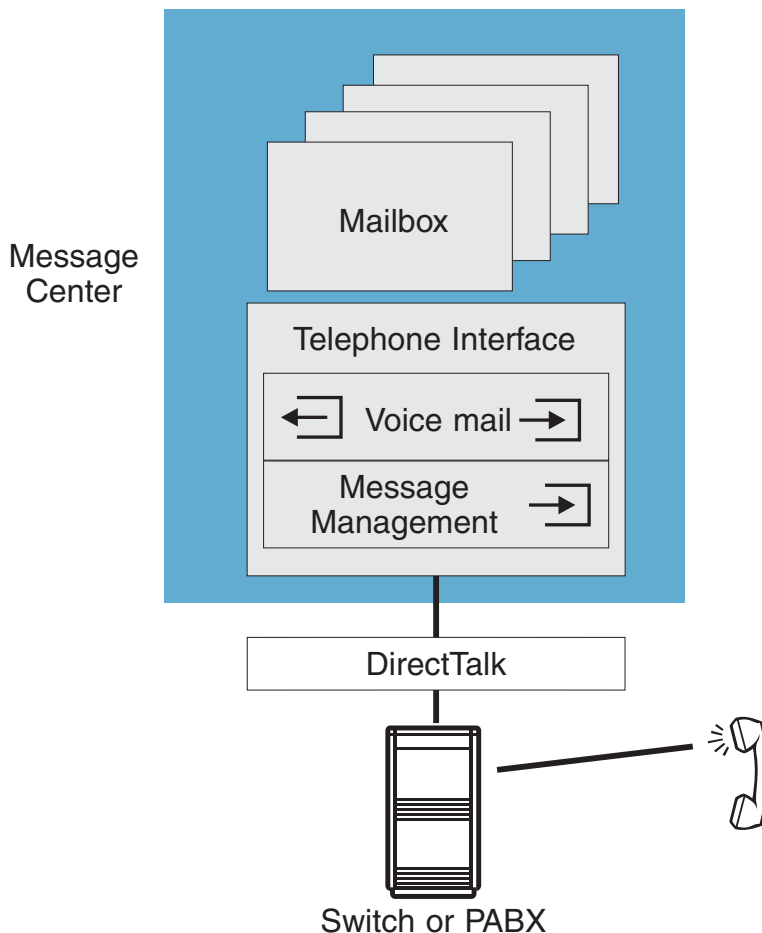
Figure 4. A basic voice mail system with Message Center

Basic voice mail system with fax: On top of the basic system shown above, you can add the ability to receive and store faxes in the same mailbox for transmission to fax machines.

Accessing messages: When subscribers access their mailbox using the telephone, Message Center tells them how many new and saved messages are in it. If you've implemented fax support, the fax messages will be included in this list.

Voice messaging system
Moving on from the basic system described above, you can configure Message Center to support sending and forwarding voice mail to other user mailboxes on the same system or on external systems.

responding flexibly to your needs

Using voice messaging, not only can subscribers exchange messages between each other on their Message Center system, but they can also transfer messages to other mail systems using one of the following methods:

AMIS-A protocol
> where a telephone call is made from one system to another system to transfer a message.
>
> This is an industry standard supported by most voice mail systems. Message Center can therefore exchange messages with other manufacturers' voice mail systems, as long as both systems are on the same telephone network.

DTM-D protocol
> which transfers a message to another Message Center system over a *LAN*.
>
> This is much faster and more efficient than AMIS-A and preserves the digital quality of the original recording. However, you can use it only to exchange messages between Message Center systems.

Voice Protocol for Internet Mail (VPIM) protocol
> which enables Message Center to exchange messages with other voice mail systems which support it, as well as with e-mail systems.
>
> This digital industry standard uses the Internet mail *Simple Mail Transfer Protocol* (*SMTP*) services with *Multipurpose Internet Mail Extensions* (*MIME*).

Figure 5 on page 15 shows what such a messaging system looks like.
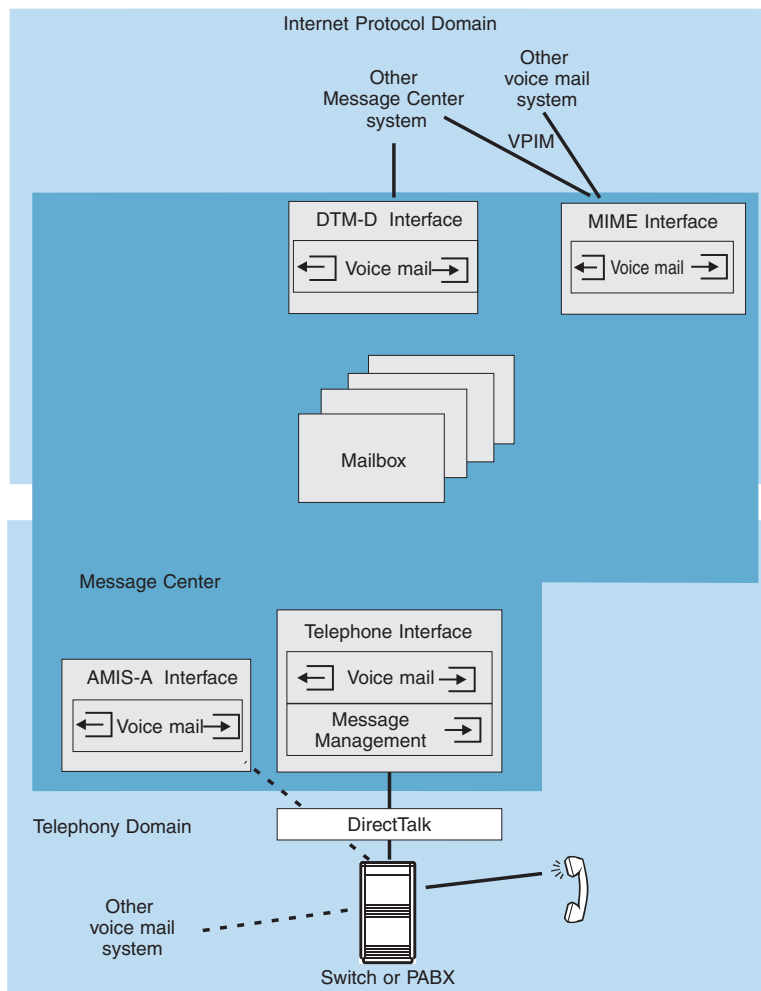
Figure 5. Voice messaging system with Message Center

Voice messaging system with fax: Just as you can with a basic voice mail system, you can add fax handling to your voice messaging system. In addition to handling their voice messages, this lets your subscribers store and retrieve faxes in the same mailbox.

Accessing messages: To access messages within their mailboxes, subscribers can use a telephone, a Web browser, an IMAP4 compliant e-mail client like Microsoft Outlook Express or a WAP device:

Using a telephone...
> Subscribers can access voice mail messages from the local Message Center database. Message Center tells them how many new and saved messages are in the mailbox.

responding flexibly to your needs

For fax messages, subscribers can receive fax mail messages on the same call to the Message Center system, or transmit them to a fax machine on another line.

They can then send and forward messages with comments, set special message attributes such as urgent, private, and acknowledge, and set a message to be delivered at some future date and time. Subscribers can also configure their mailboxes using the telephone.

Using a Web browser...

on a multimedia PC provides a visual method for managing messages.

Subscribers can list, view, forward and reply to messages. The type of viewer used depends upon the message type. Voice messages can be played using a PC audio card, or directed to a telephone. E-mail messages can also be displayed. If fax support has been enabled, faxes can be displayed using a TIFF viewer, or printed on a local printer.

Subscribers can also use a Web browser to configure their mailboxes.

Using an IMAP4 e-mail client...

Subscribers can access all their voice messages using a full-fledged e-mail client. They can listen to the voice messages and view their faxes if fax support has been enabled in Message Center. They can delete and forward their messages and organize them into folders.

Using a WAP device...
Subscribers can configure their mailboxes, send e-mails, reply to messages and forward messages.

Figure 6 on page 17 shows how using the Web browser and WAP fits into the voice messaging system pictured in Figure 5 on page 15. It also introduces fax into the picture. To implement WAP, the Web server needs a TCP/IP connection to a WAP gateway. WAP devices communicate with the web server via the WAP gateway, which translates the protocol from WAP to HTTP.
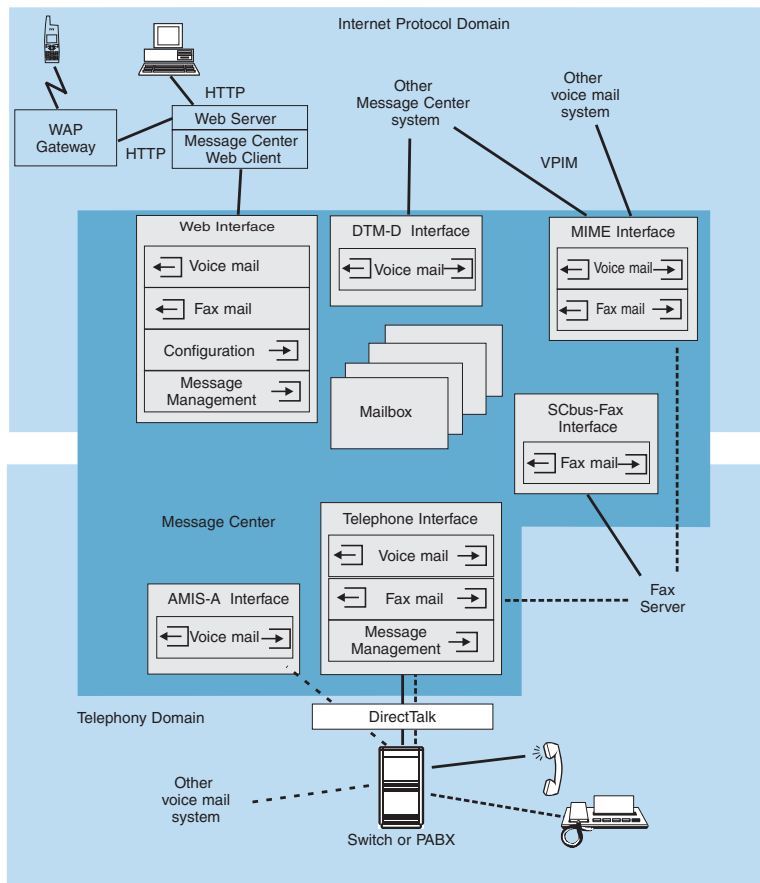
Figure 6. Web browser access in a Message Center voice messaging system

Integrating voice, fax, and e-mail messaging systems

You can configure Message Center to support voice mail, optional fax mail, and also to interface with external e-mail systems.

Integrating Message Center and e-mail systems using SMTP/MIME: You can configure Message Center mailboxes to forward voice and fax messages automatically to an e-mail server, using SMTP/MIME. This allows the voice or fax messages to be stored on the e-mail server and accessed by e-mail clients:

- Voice mail can be sent to the e-mail system in the form of an e-mail with a .wav or .au format file attachment.
- Fax mail can be sent to the e-mail server in the form of an e-mail with a *.TIFF/F* format file attachment.

responding flexibly to your needs

Message Center forwards the voice or fax messages automatically to the e-mail server, with or without storing a copy of the message in the Message Center system for retrieval by telephone. If no copy of the message is stored in the Message Center system, save and delete actions in the e-mail system don't need to be synchronized with the Message Center system.

Note: The SMTP/MIME protocol is defined only for sending mail items. Therefore, the Message Center system cannot retrieve any mail items from the e-mail server using this protocol, nor can it synchronize the deletion of messages between itself and the e-mail server.

Integrating Message Center and e-mail using IMAP4: Assuming that messages are stored within Message Center, subscribers can access their voice, fax, and e-mail from any IMAP4-compliant or e-mail client, the telephone, or using a Web browser.

To access messages from an IMAP4 compliant e-mail client, you set up two links:
- From the IMAP4 client to Message Center so that subscribers can access voice and fax
- From the client to a remote IMAP4-compliant e-mail server so that subscribers can access their e-mail.

Using multimedia-capable PCs, subscribers can listen to their voice messages in one of two formats:
- Streamed RealAudio
- .wav files

They can also view any faxes they may have, as long as they have an appropriate TIFF file viewer installed on their PCs.

If you set up Message Center so that subscriber mailboxes can access e-mail from an IMAP4 e-mail server, e-mail can be played back to them using a process called **text-to-speech**. Message Center doesn't do this itself; it uses a separate text-to-speech engine that you install. Message Center currently supports the following text-to-speech engines:
- BeST Speech from Lernout & Hauspie
- AcuVoice Speech Synthesizer AV 2001 for AIX from Fonix
- ViaVoice TTS for AIX from IBM

Message Center does not come pre-packaged with any of these text-to-speech engines; you can choose the one you prefer and purchase it separately. Consult your IBM Representative for further information.

Accessing messages: When the messaging systems are integrated using either SMTP/MIME or IMAP4, subscribers can access messages:

Using an e-mail client,
> to manage voice, fax, and e-mail messages with all the capabilities of that client: usually listening to or displaying the messages, forwarding them, saving them, deleting them, and so on.

Using the telephone, when copies of voice and fax messages are stored in Message Center or accessed using IMAP4,
> you get all the telephone access capabilities of a voice and fax messaging system (see "Voice messaging system" on page 13).

> In addition, if Message Center mailboxes receive e-mail sent to Message Center directly (instead of to an e-mail server), Message Center can play the e-mail to a caller using FirstByte *text-to-speech* technology. (This is possible only if you have installed the AIX Ultimedia file sets.)

Figure 7 on page 20 shows messaging system integration.
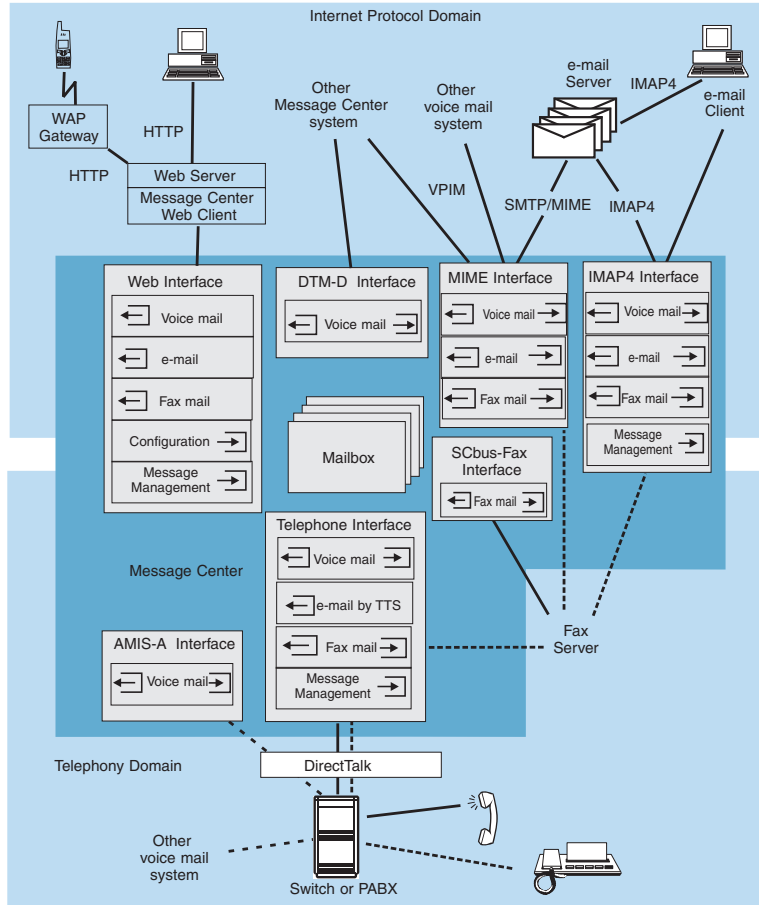
Figure 7. Integrating messaging systems with Message Center

System partitioning

You can divide a single Message Center system into multiple voice mail *partitions*, where each partition can have its own system administrator. You could use this feature to:

- Have multiple companies share a single voice mail system where it isn't cost effective for each to have its own. This lets you use specific greetings to personalize the business, route calls, and so on.
- Group subscribers in a large organization into departments, with each department being administered locally.

Multiple companies sharing a single system

You can configure Message Center to support multiple companies on a single system. In this configuration, each company is isolated from all others. Each has its own system administrator responsible for day-to-day moves, additions, and changes for subscribers.

Subscribers within one partition cannot interact with subscribers in another partition. Similarly, an administrator of one partition cannot view, access, or manage subscriber profiles or data on another partition.

Multiple departments within an organization

You can configure Message Center to divide a large organization into multiple partitions where the administrative responsibilities can be distributed to administrators within each department.

This is similar to the multiple company configuration, except that only the administrative responsibilities are isolated. Subscribers can interact with any other subscribers, regardless of the partition to which they belong.

Message Center for Telcos/ISPs

Telcos and Service Providers can deploy Message Center either as an information service or inside the network as a value-added service offering.

Telephony Portal

You can configure Message Center so that it acts only as an interface to the telephone system and it doesn't have any mailboxes nor store any messages locally. When used in this configuration, Message Center will obtain any subscriber information it needs from an LDAP server and it will store and retrieve messages, voice and e-mail, from either an IMAP4 or POP3-compliant e-mail server.

By using Message Center as a telephony portal, you can eliminate any system administrative task from Message Center and perform all of your administrative tasks on the LDAP server.
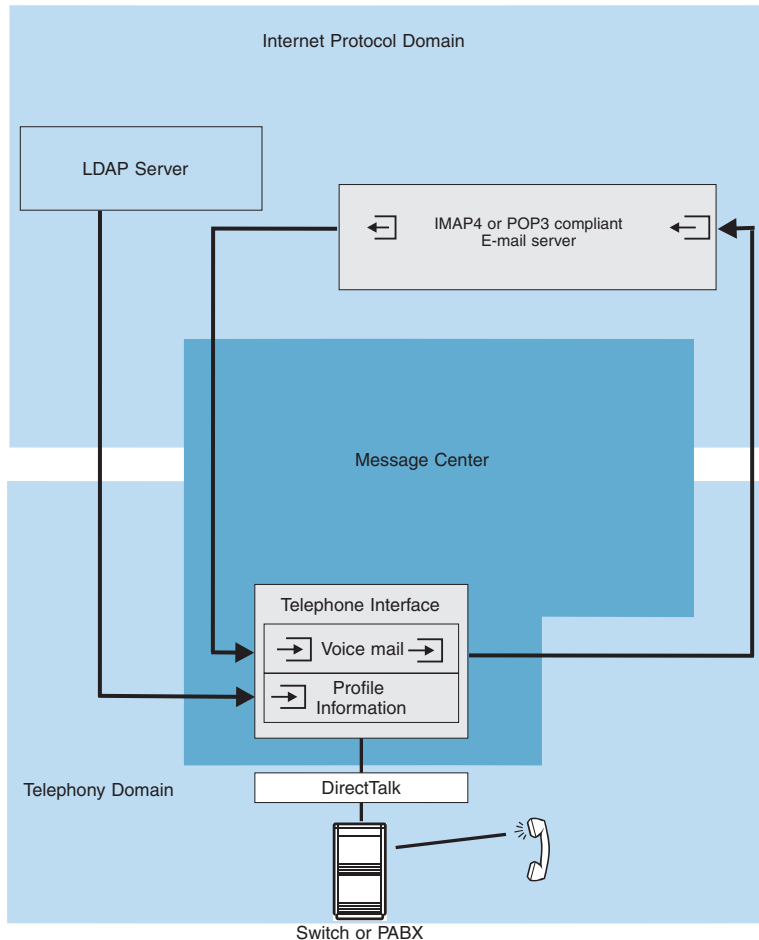
Figure 8. Use of a telephony portal system within Message Center

Message Center in more detail

Having looked briefly at the wide range of integrated mail systems you can build using Message Center, let's look in more detail at what you do to set up those systems. We'll look at:

- "Routing telephone calls to Message Center" on page 23
- "Virtual mailboxes" on page 24
- "Leaving messages using the telephone" on page 24
- "Accessing messages using the telephone" on page 25
- "Accessing messages using the World Wide Web" on page 27
- "Communicating with external notification interfaces" on page 31
- "Exchanging messages with other messaging systems" on page 32
- "Creating an integrated mail system" on page 34

Providing some of the functions described might mean tailoring (customizing) Message Center to suit your local environment. For example, you might need to customize it to suit your telephone switch or e-mail system.

You can customize the system in many ways, from adding paging interfaces or configuring the Web interface, to recording your own prompt dialogs and changing the keys allocated to functions. Here, we describe the basics. You'll find all the detail you need in the chapter, "Customizing Message Center", in the *IBM Message Center for DirectTalk: Administrator's Guide*.

Routing telephone calls to Message Center

How Message Center receives a call depends on who is calling:

Callers dialing in

Callers, trying to contact a subscriber, usually dial a specific telephone number. This is often referred to as *Direct Inward Dialing* (*DID*) from the telephone network to a telephone or extension on a *PABX*. The switch or PABX is usually set up to route the call to the subscriber's telephone.

If the subscriber's telephone is busy, rings for a specified number of times without answer, or has been forwarded to voice mail, the telephone switch forwards the call to Message Center.

When the call is forwarded, it is useful if the called and calling numbers are passed to Message Center so that it can select the mailbox in which to leave the message.

Subscribers dialing in

Subscribers dialing in to Message Center to log on to their mailbox usually have a single telephone number to access the whole system. This number is then routed by the switch or PABX directly to Message Center. The more information the switch or PABX can pass to Message Center about the called and calling numbers or extensions, the easier it is to process and the less information the subscriber has to provide to access the system.

How Message Center processes incoming calls

Message Center processes incoming calls in three ways, which you can configure to suit your voice messaging requirements:

DID mode

Message Center tries to use the incoming called number to choose the appropriate mailbox to deposit a message or log on to. The switch can provide the called number in a variety of ways, including data links (such as *SMSI* or *ACL*), *ISDN*, or in-band *DTMF* signalling. If the switch doesn't provide the called number, the application profiles configured on the telephony lines themselves or the default application is invoked. You can configure the default application profile as *auto-attendant* or *quick message*, as described below.

Auto-attendant mode

In this mode, Message Center can answer incoming calls and ask the caller for

Message Center in more detail

the number they want. If the auto-attendant application can't connect the caller to that number, it passes the called number to Message Center, which plays the subscriber's greeting.

Quick message mode

You can set up a central *quick message* number to let callers leave voice messages for mailboxes without actually calling the mailbox numbers. In this way, voice mail, like e-mail, need not interrupt the work of the recipient in the way that a telephone call often does.

The caller has to enter the mailbox number of the recipient at the *quick message* prompt, just as they do in auto-attendant mode. In quick message mode, Message Center does not try to transfer. A caller who is another subscriber does not have to log on to the mailbox before being allowed to send a message to another subscriber.

Virtual mailboxes

In a typical voice messaging environment, each subscriber has a physical telephone handset. But this is not absolutely necessary. Administrators can set up subscribers so that calls to their number do not ring on a phone, but go instead directly to their *virtual mailbox*. Such subscribers have all the features and functions available to them that all other subscribers have.

By tailoring the supplied Message Center system, you can enable virtual mailboxes using one of:

* A DID number configured in the switch that routes to Message Center. When that number is dialed by internal or external callers, the calls are picked up immediately by Message Center.

* An auto-attendant. When callers dial the main auto-attendant number, they are prompted to enter the mailbox number of the person for whom they want to leave a voice message. Instead of trying to transfer the call to the subscriber, the auto-attendant puts the caller directly into the subscriber's mailbox, first playing the greeting and then allowing the caller to record a voice message.

Subscribers with virtual mailboxes retrieve their messages using the same menus as other subscribers.

Note: As noted above, enabling virtual mailboxes with an auto-attendant involves tailoring Message Center. For help with this, contact your IBM representative or business partner.

Leaving messages using the telephone

Callers can leave voice, and possibly fax, messages in a subscriber's mailbox, depending on what type of mailbox that subscriber has:

Voice mailbox only

If the mailbox supports only voice messages, access to it involves just one access number and path. DID, auto-attendant, and quick message can all be used.

Voice and fax mailbox

If the mailbox supports both voice and fax, there are two ways of handling messages:

1. Have one number for both voice and fax messages.

   The advantage of this is that it involves fewer telephone numbers in the system design. However, if you use DID access to the Message Center system, subscribers may receive calls from callers trying to send faxes to their telephones. Make sure that your subscribers know how to transfer any such calls from fax machines back into Message Center.

2. Have two numbers. The first is for callers leaving voice messages and for the subscriber to access the mailbox; the second is for leaving faxes.

   This allows direct dialing to subscribers' telephones without the risk of the subscriber receiving calls from fax machines. Message Center forwards any fax messages to the subscriber's mailbox.

Leaving voice messages

Once Message Center has answered an incoming call, the caller usually hears the subscriber's pre-recorded greeting. The caller can then leave a message in the subscriber's mailbox (unless the mailbox is full).

Leaving fax messages

Once a call reaches Message Center, and assuming that the subscriber's mailbox has been set up with fax support, DirectTalk's background fax detection detects the initial fax tones and bypasses the greeting. As long as the subscriber's mailbox is not full, Message Center routes the incoming call to a fax server, as follows:

- If the fax server uses the *SCbus* fax interface, it receives the incoming fax directly on Message Center's own trunk lines and passes it to Message Center as a .TIFF/F file to store in the subscriber's mailbox.

- If the fax server uses the SMTP/MIME interface, Message Center transfers the call to the fax server's lines, and the fax server receives the incoming fax on its own lines and sends it to Message Center as an SMTP/MIME message with a .TIFF/F file attached to store in the subscriber's mailbox.

If the subscriber's mailbox does not support fax, DirectTalk's fax detector detects the fax and clears the call to prevent the voice mailbox recording a message full of fax tones.

Accessing messages using the telephone

To access their messages using the telephone, subscribers first dial their access number to the Message Center system, with one of the following results:

1. If the answer mode is auto-attendant, Message Center prompts subscribers to enter a number to which to transfer the call. If the number is the main logon number, Message Center continues as described below.

2. If the answer mode is DID, and subscribers have called the main logon number, Message Center can prompt them for their mailbox number. At this point, if subscribers have called from their own number, and the switch has provided this *calling number* information, they need only press #.

Message Center in more detail

Message Center then usually prompts subscribers for their password. However, you can configure Message Center to skip prompting, both for the password and mailbox number, if subscribers have already been authorized by the fact that they are calling from their own number. This may not suit all environments, but may be appropriate for **Residential** subscribers, or those who have to use an authorization code to log on to their telephone handsets.

3. If the answer mode is DID, and subscribers call their own number, they can *jump out* from their greeting to the logon prompt by pressing just two keys (by default, *7). When Message Center then prompts them for their mailbox number, they need only press # and Message Center assumes that they want to log on to the called number. Message Center then prompts for their password as described above.

Once into the mailbox, if the subscriber chooses to listen to the messages, Message Center provides a summary of the number of new and saved messages. All messages are stored in first in first out (FIFO) order by default, so that the oldest new message left is accessed first. However, messages set to *urgent* or *emergency* priority jump straight to the head of the queue.

Voice and fax messages are stored in the same mailbox; there is not a separate *sub-mailbox* for fax messages to be processed independently.

You can configure Message Center to play message header information as part of the message. A voice message with header information sounds like this:

```
New Message number 1 from caller 01962815000, received on

Tuesday October 6 at 1:20pm. Hi, this is............
```

The same voice message with header information disabled would sound like this:

```
New Message number 1. Hi this is......
```

Similarly, a fax message with header information disabled would sound like this:

```
New Message number 5. This message is a fax.
```

Listening to voice messages

While playing back a message, there are a number of things you can do:

- Control the playback: stop, start again, fast forward, rewind; play the message faster, slower, quieter, louder
- Delete the message
- Return to the control menu

After you've played back a message, you can do a different set of things:

- Manage the messages: save and delete
- Control the play sequence: play again, go to the next message
- Get help, return to the control menu
- Call the sender if the number is known
- Reply by recording a message

• Forward the message to another subscriber

Note: Some of the options may not be available, depending on whether call transfer, replying to, and forwarding messages are enabled.

Listening to fax messages

The actions available during and after playing back voice messages are all available for a fax message. In addition, you can send a fax message to a fax machine on a separate call, or, if you've called from a fax machine and the fax server integrated with Message Center uses the SCbus interface, on the same call. The fax goes either to the default fax number or to the number the subscriber enters.

Listening to e-mail messages

Subscribers of certain subscriber types can also retrieve remote e-mail messages that reside on an IMAP4 or POP3-compliant e-mail server. These e-mail messages are presented to the subscriber in a message queue separate from the one with their voice and e-mail messages.

The text parts of the e-mail messages are played to the subscriber using text-to-speech. After retrieving such e-mail messages, subscribers can:

• Manage the message: save and delete

• Play the message again

• Reply to the sender of the e-mail message by recording a message that is converted to a .wav file and sent back to the sender as an e-mail attachment

• Forward the e-mail message to someone else, adding a comment if they want.

When retrieving e-mail messages, subscriber have the ability to filter their messages so that only messages from certain people will be played. They can filter their messages based on entries in a personal directory or on an LDAP server.

Accessing messages using the World Wide Web

Assuming that messages are stored in Message Center, subscribers can access their voice mail, fax, and e-mail from the World Wide Web, depending on:

• Whether you've set up a World Wide Web page.

• The solution you've implemented. All Message Center solutions allow subscribers to access voice messages using the Web; only solutions with fax allow them to view fax attachments; only integrated messaging systems allow them to view e-mail as well.

If you are configured as a **Business - local & remote** or **Remote e-mail only** subscriber, you can also access your e-mail messages that reside on a remote IMAP4 or POP3-compliant e-mail server.

Assuming that you've set the system up appropriately, as described in the *IBM Message Center for DirectTalk: Administrator's Guide*, your subscribers can access their messages using Internet Explorer.
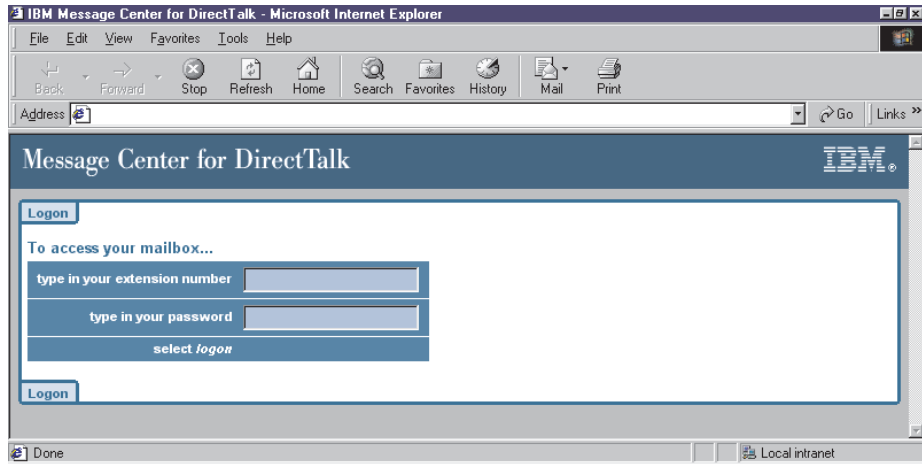
Message Center in more detail

Figure 9. The Web page for logging on to Message Center

Figure 9 shows the logon Web page subscribers will see when they start up the Web interface.

To access your messages, type in your extension number and password in the Message Center logon page and then select the Logon button.

If you've provided the correct extension number and password, the next page you will see will be your inbox. This will look similar to the example shown in Figure 10 on page 29.
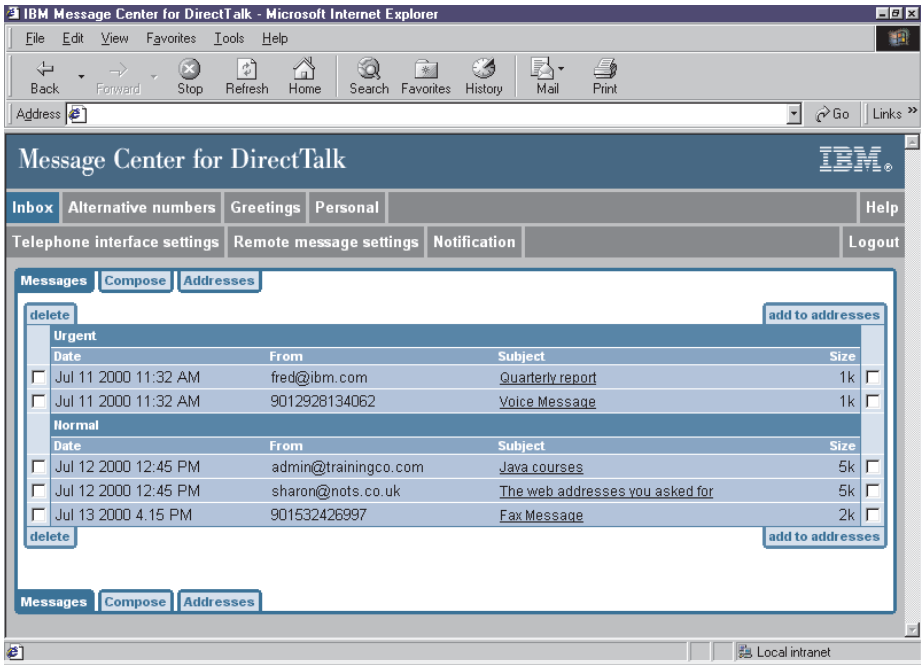
Figure 10. The Web page that lists your messages

This page displays all the messages in your inbox - voice, fax and e-mail.

The types of messages you'll see will depend on the type of subscriber you are, as shown in Table 2

Table 2. Messages displayed according to subscriber types

Message Type	Standard	Business - local	Business - local & remote	Residential	Remote e-mail only
Voice	Yes	Yes	Yes	Yes	No
Fax (fax server needed)	Yes	Yes	Yes	Yes	No
Remote e-mail	Yes	No	Yes	No	Yes

Your messages are presented in two groups. The first contains urgent messages, while the second group contains non-priority messages. Neither of these groups will be displayed if there are no messages in them.

To view or play a message, simply click the **Subject** hyperlink for that message.

If the message is an e-mail, a new page is displayed, containing the contents of that e-mail, with options to download attachments, to reply, or to forward the message.

Message Center in more detail

If the message is a voice message or a fax, an appropriate viewer is opened for the message. The type of viewer depends upon the type of message and upon the **Preferences** you have set. You can access these preferences through the **Alternative numbers**, **Greetings, Personal**, **Telephone interface settings**, **Remote message settings** and **Notification** tabs from the menu bar at the top of the web page. You'll find a complete description of your Message Center preferences and what you can do with them in the *IBM Message Center for DirectTalk: Subscriber's Guide*.

You can delete messages by clicking the checkbox to the left of the message you want to delete (this puts a cross in the checkbox) and then clicking the **Delete** button. If you're a **Business - local & remote** or **Remote e-mail only** subscriber, you can add the address of the person that has sent you a message to your address book by selecting the checkbox to the right of the message from the sender whose details you want to save, and then clicking the **Add** button.

If you're not sure what to do on this page at any stage, try the **Help** tab. If you have finished accessing Message Center or if you want to start all over again, click **Logout** to return you to the page you signed on to.

Accessing messages using a WAP

If a WAP gateway has been defined and the WAP pages have been installed then, depending upon your subscriber type, you can do the following from a WAP device:

- If the WAP device is a mobile phone, listen to your messages in the same way as from a normal phone by dialling in to Message Center
- List messages
- Delete messages
- Read e-mail (not attachments)
- Send e-mail
- Reply to message (using e-mail)
- Forward message

Currently, you cannot play/view voice and fax messages on a WAP device when it's being used in WAP mode.

Messages are sent as e-mails. Therefore only Business - Local & Remote and Remote E-mail Only subscribers have access to the last 4 functions in the list above.

On accessing the system from a WAP device, you will be presented with a logon screen. Enter your profile and password. If valid, you will be presented with a list of your messages - voice, fax and remote e-mail (depending upon your subscriber type). You'll only be able to view your e-mails. You'll be able to reply to all message types, by sending an e-mail to the source of the message.

You can also access your preferences through the WAP interface. These are described in the *IBM Message Center for DirectTalk: Subscriber's Guide*.

Exchanging messages between mailboxes

Message Center subscribers can exchange messages without calling each other. This is a useful way of getting a message to someone when you know that an interruption would be unwelcome, or when you don't have time for a lengthy conversation.

Here's what you can do:

- Reply to messages you receive with further voice messages.
- If you already have a message that you want to share with someone else, you can forward that message to their mailbox.
- Sign on to Message Center, choose who to send a message to, then record the message and send it. (You can also do it the other way round: record the message, and then decide who to send it to.)
- Send messages to people on other voice mail systems, as long as you have configured Message Center to recognize the numbers of mailboxes on those systems, and those systems conform to AMIS-A or VPIM, or are Message Center systems with DTM-D.
- Send messages to people on e-mail systems, as long as you have configured Message Center to translate certain numbers (or dial-by-name entries) into e-mail addresses.

Before you send a message, you can change its attributes, setting a priority, a privacy level, a delayed delivery, and so on.

Communicating with external notification interfaces

You can customize Message Center to communicate with multiple external notification devices, such as:

- E-mail systems
- *Message Waiting Indicator*s (*MWI*) on telephone sets (if the switch provides interfaces allowing them to be set)
- Paging devices
- *Short Message Service* (*SMS*) interfaces on wireless systems to communicate with the screens on cellular telephones

Message Center has e-mail messaging facilities built in; all you need to do to enable e-mail for notification is to define an e-mail address in each subscriber profile.

DirectTalk can set MWIs on most switches, using *exchange data link*. However, to integrate Message Center with pagers or SMS servers, you need either:

- A command-line utility that runs under AIX and communicates with the server, or
- A good enough understanding of the server network communications protocol to do your own services development.

You can get help in this from your IBM representative or IBM business partners.

Message Center in more detail

Exchanging messages with other messaging systems

You can set Message Center up so that subscribers can send messages to, and receive messages from, subscribers on other mail systems. This is known as *external messaging*.

Message Center *remote nodes,* or remote destinations, are identified by a numeric code, the *node code*. This code is used as a prefix to the receiving mailbox ID.

As explained in the previous section, Message Center supports the following protocols for external messaging:

- Simple Mail Transfer Protocol (SMTP) with Multipurpose Internet Mail Extensions (MIME), the standard for the digital exchange of data (such as voice and fax messages) between e-mail systems.
- Voice Protocol for Internet Mail (VPIM), the standard for the digital exchange of voice messages between different voice mail systems. This is a special case of the SMTP/MIME protocol.
- Audio Messaging Interchange Specification (AMIS-A), an analog specification for exchanging voice messages between different systems. This is an industry standard supported by most voice mail systems. Message Center can therefore exchange messages with other manufacturers' voice mail systems, as long as both systems are on the same telephone network.
- DirectTalkMail Digital (DTM-D), a digital protocol for exchanging voice messages very rapidly between Message Center systems.

Note: You cannot use DTM-D with other manufacturers' voice mail systems.

SMTP/MIME and VPIM

Voice Protocol for Internet Mail (VPIM) is a standard for transferring voice messages between different voice mail systems using internet e-mail. It is based on the Internet e-mail standards, Simple Mail Transfer Protocol (SMTP) and Multipurpose Internet Mail Extensions (MIME). Different voice mail systems can exchange messages if they can send and receive e-mail with sound attachments. Message Center can exchange messages with VPIM-enabled voice mail systems.

In addition, Message Center and e-mail systems can exchange messages using sound files attached to Internet-style e-mails based on SMTP/MIME. To define VPIM and SMTP/MIME destinations, you (or your IBM business partner) use the utility described in the section, "Message Center Interface Tool (MCIT)" in the *IBM Message Center for DirectTalk: Administrator's Guide*.

To define the mailboxes on your Message Center system as able to receive VPIM or SMTP/MIME mail, change the AIX mail *aliases* file, as explained in the section, "Implementing VPIM or SMTP/MIME external messaging", in the *IBM Message Center for DirectTalk: Administrator's Guide*.

You can also define mailboxes to forward copies of messages to an e-mail address automatically. This provides some level of integration of voice mail and e-mail, or an

alternative way of defining external message destinations. See the section, "Change Details of a Subscriber (changeuser)", in the *IBM Message Center for DirectTalk: Administrator's Guide* for details.

Audio Messaging Interchange Specification (AMIS-A)

Message Center also supports the Audio Messaging Interchange Specification (AMIS) analog specification for exchanging voice messages between different systems. Subscribers can reply to AMIS-compliant messages from another system, and forward messages to AMIS-compliant destinations. You can also include AMIS-compliant destinations in a distribution list.

AMIS analog protocol

> Subscribers can use Message Center to send messages to, and receive messages from, any other voice messaging system using the same protocol.

> Using the AMIS analog protocol, the sending system calls the receiving system and the message is recorded in real time. For this reason it is not suitable for sending large numbers of messages.

> This protocol complies with the *AMIS (Audio Messaging Interchange Specification) Analog Protocol (Version 1, Issue 2),* dated February 1992.

AMIS analog protocol with proprietary extensions

> Subscribers can send messages to compatible Message Center systems using a proprietary implementation of the AMIS analog protocol, which allows additional information, such as the security level and the urgency, to be sent with the message.

> When a message is sent to more than one mailbox at another Message Center node, only one copy of the message is transmitted, with a list of the receiving mailboxes. (The standard AMIS analog method sends a copy of the message to each receiving mailbox.)

To define AMIS-A remote nodes, you (or your IBM business partner) use the utility described in the section, "Message Center Interface Tool (MCIT)" in the *IBM Message Center for DirectTalk: Administrator's Guide*.

DirectTalkMail Digital (DTM-D)

DirectTalkMail Digital (DTM-D) transfers messages directly from one Message Center system to another, using DirectTalk compressed format. If only Message Center systems are involved, this is the fastest way of transferring messages; it involves little packaging and no uncompression or encoding.

Before deciding to use DTM-D, however, you need to decide whether speed is what is most important to you. DTM-D doesn't try repeatedly to deliver messages. If the receiving Message Center system is not available, it returns the message to the sending mailbox with an appropriate message. So, if reliable delivery is more important to you than speed, use VPIM instead. In the same situation, VPIM carries on trying to deliver the message (it uses the standard AIX sendmail process).

Message Center in more detail

To define DTM-D remote nodes, you (or your IBM business partner) need to use the utility described in the section, "Message Center Interface Tool (MCIT)" in the *IBM Message Center for DirectTalk: Administrator's Guide*.

Remote audio names

Audio names identify the senders and recipients of messages. When a Message Center subscriber receives a message, the message header gives the date and time of receipt, and, if there is one, plays the audio name of the sender. When you're sending a message to another subscriber, Message Center reads the audio name of the intended recipient so that you can check that the message is going to the correct person.

Remote audio names identify senders and recipients not on the local Message Center system. You can configure remote audio names:

- By allowing VPIM to pack them with a message, then unpack them on the receiving system
- Using *network file system* (*NFS*) to mount a copy of the remote Message Center system's audio name directories
- Using *file transfer protocol* (*FTP*) to copy the directories from the remote Message Center system

For detailed information, see the section, "Setting up remote audio names and location names", in the *IBM Message Center for DirectTalk: Administrator's Guide*.

Accessing e-mail on a remote server

Business - local & remote or **Remote e-mail only** subscribers can retrieve e-mail that resides on an IMAP4-compliant e-mail server.

Creating an integrated mail system

In a 'mail rich' world, people have more mail items, and many different kinds of mail. The ideal integrated mail system must therefore provide:

- Access to any e-mail, fax, or voice message
- Immediate notification of any message
- Sufficient data to indicate to the recipient whether to look at the message immediately or leave it for later

Message Center and DirectTalk can be customized to form the basis of an integrated mail system that satisfies these requirements: a single point of access to voice, fax, and e-mail for office, home-based, or mobile workers.

Converting voice mail to e-mail

The VPIM support in Message Center lets you convert voice mail to SMTP/MIME e-mail. This gives the individual subscriber the option of having all voice messages converted to SMTP/MIME e-mail notes and sent to the subscriber's Internet e-mail address.

Also, Message Center can receive e-mail notes containing sound files (in .wav or .au format) and save them as voice messages in the receiving mailbox.

Converting e-mail to voice mail

You can view your e-mail messages as text on the World Wide Web.

You can also use SMTP/MIME and VPIM to convert simple text-based e-mail received by Message Center into text-to-speech mail messages. If an e-mail system can forward e-mail to Message Center, subscribers can retrieve it from a telephone using text-to-speech.

In addition, IMAP4 and POP3 support lets you listen to e-mail on remote e-mail systems that support IMAP4 or POP3 using text-to-speech, as explained in "Integrating Message Center and e-mail using IMAP4" on page 18.

Integrating fax and voice mail

Message Center also supports fax attachments as part of its VPIM standard. You can configure it to:

- Accept faxes from, and deliver them to, any VPIM-compliant fax server
- Work with the Brooktrout Technology Inc. fax solution as a fax mail system

Message Center tells subscribers that they have a fax. They can look at it using the World Wide Web or an IMAP4 e-mail client, forward it automatically to an SMTP/MIME-compliant e-mail server, or send it to a fax machine.

Mobile access

You can also customize Message Center to enable mobile users to receive notification from a paging device, and then access all types of incoming mail from a cellular or ordinary phone. They can listen to voice messages, ask for faxes to be sent to the nearest local fax machine, and have e-mail messages read to them using text-to-speech.

Message Center Web and WAP Interface Software Architecture.

The software architecture that supports the Web and WAP interface is a layered model, and is illustrated in the following figure.
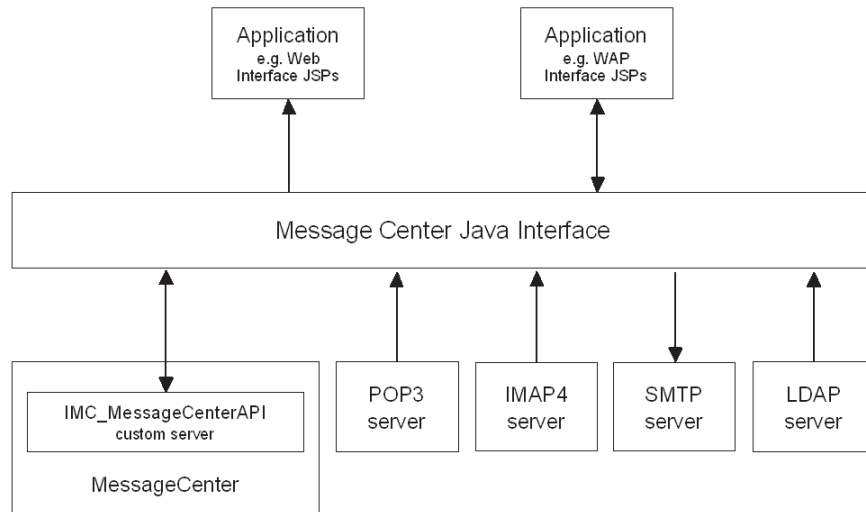
Message Center in more detail

Figure 11. Web/WAP interface architecture

IMC_MessageCenterAPI is a custom server which acts as an interface to Message Center, and is described in more detail in *IBM Message Center for DirectTalk: Administrator's Guide*. This interface is used to manage subscriber settings, and to access Message Center messages.

Message Center messages can be voice, fax or e-mail messages sent to the Subscribers' extension. Fax messages are presented as a voice message ("This is a fax message") with the fax as an attached TIFF/F file. E-mails are presented as a voice message with the e-mail body as an ASCII attachment. E-mails are sent out via the SMTP server, the settings of which are obtained from the IMC_MessageCenterAPI custom server

Depending upon their type, subscribers may have a remote e-mail account which is accessed from either an IMAP4 or POP3-compliant e-mail server.

IMC_MessageCenterAPI is also used to access a subscriber's personal directory, though the architecture also allows access to a remote LDAP server for searching of system-wide and corporate directories. Each subscriber can specify (in their preferences) a different corporate address book.

The Message Center Java interface forms a layer that encapsulates the functionality provided by these different servers. This layer deals with the sockets interface and other low-level concerns

At the presentation layer, we use Java Server Pages (JSP) which invoke the Message Center Java interface methods, and present the data to the client's Web browser or WAP device.

Chapter 2. Your users and their needs

Before moving on to look at the planning you need to do before implementing Message Center, we need to look at what it offers to its primary users:

- "What Message Center offers subscribers" below
- "What Message Center offers system administrators" on page 46

Having discussed the facilities available to each type of user, we'll look at the support and education they need.

What Message Center offers subscribers

Message Center subscribers have a wide range of facilities available. Setting up some of them is under the control of the system administrator, as described in "What Message Center offers system administrators" on page 46. Most, however, are under the control of subscribers themselves.

Of course, what you can do to control your environment depends primarily on what kind of subscriber you are. As explained in "Subscriber types" on page 6, there are five different types of subscriber, each with different capabilities. In this section, we look at what subscribers can do to control their own environment, distinguishing between the different subscriber types:

Table 3. What subscribers can control

Section	Subscriber types affected
"Setup for incoming calls"	**Standard**
"Alternative setup for incoming calls" on page 41	**Business - local; Business - local & remote**
"Maintaining a personal directory" on page 41	**Business - local & remote; Remote e-mail only**
"Setup for personal preferences" on page 42	**Standard Business - local; Business - local & remote**

Setup for incoming calls

Standard subscribers can set up their environment for receiving calls in the following areas:

- "Main greeting options"
- "Other caller options" on page 40

Main greeting options
The greeting options basic to being a Message Center subscriber are:

- Setting up a greeting header, to be played to callers before your current greeting
- Recording, listening to, and deleting greetings and greeting headers

The simplest way of using greetings in Message Center is just to record the greeting header, which will then be the only greeting played to callers. However, most subscribers will want more flexibility than that, so they can also set:

- Up to five selectable greetings, enabling them to easily vary what callers hear
- An announcement-only greeting that greets callers, but doesn't allow them to leave a message
- A busy greeting that is played to callers when the subscriber is using the phone

The greeting header and greeting can be played back together. The usual way of setting up the greetings and greeting header is to define the greetings as phrases that do not require changing, such as "I'm busy now, but please leave a message", or "I've left for the day. If you leave a message, I'll get back to you tomorrow". You can then change just the greeting header each day to assure people that your message is up-to-date. For example, your greeting header could be "Hello. This is Jordan Baker on Monday the third of January, 2000."

Other caller options

When a caller rings in there are some optional functions that you can offer the caller. Instead of leaving a message the caller can choose to:

- Transfer to the operator
- Transfer to an assistant
- Transfer to a *ReachMe number* (a number where the subscriber is likely to be found)
- Page the subscriber

To set these up, the subscriber sets the appropriate parameters in the mailbox and informs the caller, in the greeting, of the options set. The parameters are defined as *special phone numbers* and can be updated by the subscriber from the World Wide Web or the telephone:

- Operator number (default normally set up by system administrator)
- Temporary operator number (Standard subscriber only)
- Assistant number
- Temporary assistant number (Standard subscriber only)
- ReachMe number
- Temporary ReachMe number
- Pager number (the number of the paging bureau)
- Temporary ReachMe number (Standard subscriber only)
- Pager reference (the number of the pager itself)
- Temporary pager reference (Standard subscriber only)

Subscribers can also set up a *call-forwarding* number to which Message Center will try to transfer callers before they hear the subscriber's greeting. If the transfer doesn't work, the caller hears the subscriber's greeting and has all the same options as above. This option is also known as the *referral* number.

Alternative setup for incoming calls

Business - local and **Business - local & remote** subscribers have a different greetings structure. Instead of having greetings identified by numbers, they have named greetings which they can record and make active.

As one of these subscriber types, depending on the particular named greeting that is active, callers into your mailbox have different options available to them. Table 4 shows the named greetings that are available and the default settings for the options available to callers.

Table 4. Named greetings and associated options

Greeting	Leave a message	Pager	ReachMe	Assistant	Transfer
Available and working at the office	Yes	Yes	No	Yes	Yes
Available, but working away from the office	Yes	Yes	Yes	Yes	Yes
Unavailable, but accepting messages	Yes	No	No	Yes	Yes
Unavailable and **not** accepting messages	No	No	No	Yes	Yes
Left for the day	Yes	No	No	Yes	Yes
On the phone	Yes	Yes	No	Yes	Yes

The caller options available for each named greeting can be configured by the system administrator on a system-wide basis.

Maintaining a personal directory

Business - local & remote and **Remote e-mail only** subscribers can maintain a personal directory.

As such a subscriber, you can use this directory to filter e-mail messages residing on a remote IMAP4 or POP3-compliant e-mail server. You can also use it to forward e-mail messages to other people.

You maintain your personal directory using a World Wide Web browser or a WAP device. Figure 12 on page 42 shows the sort of Web page you use.
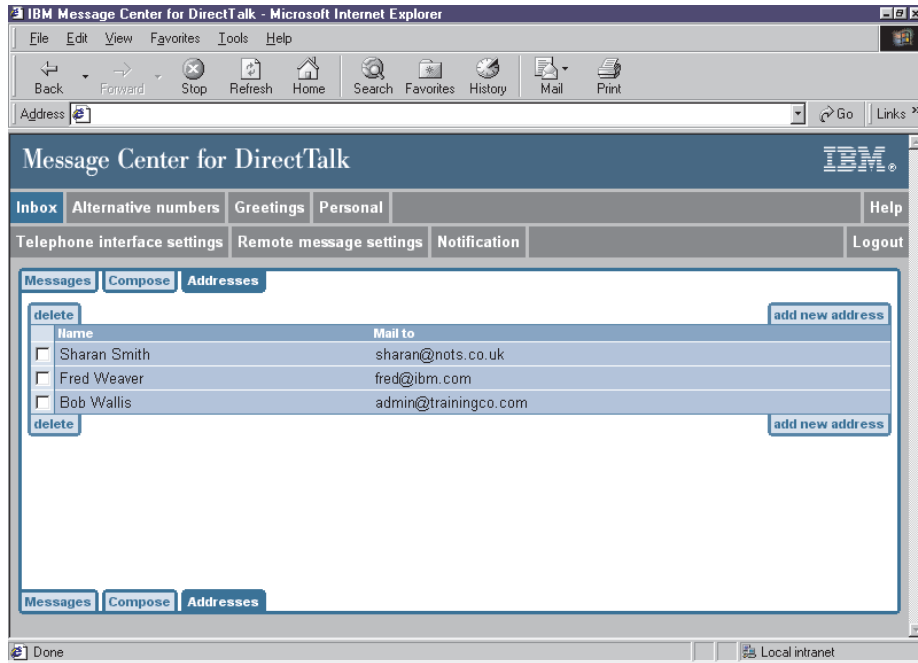
Figure 12. The Web page for maintaining a personal address book

Searching LDAP Servers

Business - local & remote and **Remote e-mail only** subscribers can access use LDAP servers when filtering their e-mail messages. They can use either a system-wide server, or they can specify a particular LDAP server to use via the WWW preferences page.

Setup for personal preferences

Standard, **Business - local**, and **Business - local & remote** subscribers have a great deal of control over how they manage the messages in their mailbox, and how the mailbox itself behaves. This section covers:

- "Listening to messages" on page 43
- "New incoming message notification" on page 43
- "Notification schedules" on page 44
- "Sending messages" on page 44
- "Working with outgoing mail" on page 45
- "Distribution lists" on page 45
- "General mailbox options" on page 45

Listening to messages

At any time, subscribers can:

- Get an indication of how many new and saved messages are in the mailbox
- Listen to and manage their voice mail items
- Listen to specific voice messages

While playing back a message, they can:

- Control the playback: stop, start again, fast forward, rewind; play the message faster, slower, quieter, louder
- Delete the message
- Return to the control menu

After the message has been played, they can:

- Manage the messages: save and delete
- Control the play sequence: go to the next message, play again
- Get help, return to the main menu
- Call the sender
- Reply by recording a message
- Forward the message to another subscriber with comments

If your installation supports fax messages, subscribers can also:

- Send the fax to a fax machine as specified in the default fax number mailbox parameter
- Send the fax to a fax machine and enter the number of the fax machine
- Receive the fax on the current call if the subscriber called from a fax machine

There are some optional settings that affect listening to messages:

- New message deletion: whether new messages can or cannot be deleted before you've listened to the whole message.
- Automatic saving: whether messages are saved automatically after you've listened to them.
- Message headers: whether to play message headers on listening to messages. (Message headers tell you who sent the message, if this information is available, and the date and time the message arrived.)
- Clock: whether to use the 12- or 24- hour format for times.

New incoming message notification

When a new message is sent into a subscriber's mailbox, this can be indicated in different ways, depending on how the system interfaces with the telephone switch or PABX, what kind of telephone the subscriber has, or options, such as choosing to get the indication by e-mail. In any organization, some of these options may be mandatory (set by the system administrator), and some optional (under subscriber's control).

If you want to enable immediate notification in any of the following ways, you need to configure DirectTalk or Message Center appropriately:

- By telephone message waiting indicator (MWI)

  This is set up and configured by the system administrator; there are no mailbox parameters to control this.

- By e-mail address

  Subscribers must have defined their e-mail address (set by the system administrator or through the World Wide Web interface). In addition, there are several *remote delivery options*:

- The remote delivery address (set by the system administrator or through the World Wide Web interface)
- The message delivery preference:
- Keep message locally; do not forward it to e-mail
- Keep message locally; forward a copy to e-mail
- Do not keep message locally; forward it to e-mail
- The remote voice type (.wav, .au, 32K ADPCM and so on)

Both immediate notification methods above are provided by default. You can also link to paging or SMS devices for this form of notification.

Notification schedules

For schedule-based notification, subscribers can control how they get notified about messages. By setting up optional *notification schedules*, they can define how, when, and where they get notification. Some of these may depend on how the system interfaces with the telephone switch or PABX, whether the subscriber has a pager or SMS indication on their cellphone, or whether they want a particular telephone number to be called.

Subscribers can set up:

- Four different notification schedules, setting:
- The time period of the schedule
- The days when the schedule is active
- The telephone or paging number
- The type of number (telephone, pager, SMS)
- The pager reference number
- The level of messages of which to be notified (emergency, urgent, or all)
- One temporary notification schedule that overrides all others

The schedules can be reviewed and turned on or off.

Sending messages

Assuming that your system is set up with voice messaging (for the mailbox to support sending messages to other mailbox subscribers), users can select the subscriber to whom to send the message either:

- By keying in the number or extension of the subscriber, or

- By keying in the digit name of the subscriber (using the letters on the phone keypad)

After recording the message the subscriber can:
- Send the message
- Review and re-record the message
- Add to the beginning or end of the message
- Set the date of delivery (future delivery)
- Specify the privacy and urgency levels
- Specify whether the message is to be acknowledged
- Cancel the message

If the subscriber has recorded an audio name, Message Center plays it back when the message is received. For ease of communication, we recommend that subscribers record audio names.

Working with outgoing mail
Assuming again that your system is set up with voice messaging, subscribers can work with their *outgoing mail*: messages recorded and sent, but not yet received by the recipient subscriber.

While listening to their list of outgoing mail, subscribers can:
- Listen to the header of the message
- Listen to the message
- Delete (cancel sending) the message
- Go to the next message

Distribution lists
Once again, your system must be configured with voice messaging for the mailbox to support sending messages to users in a distribution list.

Subscribers can create, work with, review, and delete distribution lists. The maximum number of entries in a distribution list is 90.

General mailbox options
Subscribers can also:
- Change their password
- Choose whether to use bilingual greetings
- Select normal (detailed) or expert (terse) prompt level

What Message Center offers system administrators

Message Center uses the voice messaging support in the base DirectTalk product, so you can use the DirectTalk interfaces to manage the voice messaging part of Message Center. However, to manage the advanced capabilities of Message Center that make it a unified messaging system, you should use the Message Center Interface Tool (MCIT) or other Message Center utilities.

In all, the administrator of a Message Center system will probably use:

- The X-windows menu interface of the DirectTalk base product
- The ASCII console interface of the DirectTalk base product
- The command-line utilities of the DirectTalk base product
- Other interfaces of the DirectTalk base product, such as SNMP
- The Message Center Interface (MCIT) tool
- The special Message Center utilities

As an authorized system administrator, you can:

- Set up different partitions for different businesses, or parts of your business
- Place each subscriber, or groups of subscribers, into one of the five subscriber types: **Standard**, **Business - local**, **Business - local & remote**, **Remote e-mail only**, and **Residential**.
- Delegate day-to-day tasks to *partition administrators*. These administrators can add, delete, and change subscribers belonging to the partition that they manage.
- Specify the number of invalid password attempts, after which the call is dropped and the mailbox is locked until you unlock it.
- Broadcast messages to every mailbox on the system, or arrange for others to do so. You can also create an exclusion file of mailboxes that should not receive the broadcast.
- Create a standard banner message to be played to all subscribers who call in to Message Center. A banner message can similarly be played to all callers before the greeting selected by the subscriber (for example "Please note that today is a public holiday").
- Create shared distribution lists for the convenience of all subscribers.
- Build distribution lists from an external data base, using a custom server that can convert a standard ASCII file into a Message Center distribution list.
- Update any field in a DirectTalk application profile from a command-line interface.
- Enforce a change of password for each subscriber after a specified period. Message Center also includes an exit in which you can specify location password rules and have new passwords checked for conformance. Whether or not you use the exit, Message Center checks that a new password is not the same as the current password.
- Move a subscriber, with all messages, greetings and so on, from one extension to another, or from one Message Center system to another, or both. Batch moves are also possible, based on a list of subscribers to be moved.

- Configure Message Center as a telephony portal which would use an LDAP server for all subscriber information needed and store and retrieve messages from an IMAP4 or POP3-compliant e-mail server.

For a complete description of what you can do, and how to do it, see the *IBM Message Center for DirectTalk: Administrator's Guide*.

Customizing Message Center

If Message Center does not suit your requirements exactly, you can customize it, following instructions in the *IBM Message Center for DirectTalk: Administrator's Guide*. This section summarizes the main areas you can customize.

All menus comply with International Standards Organization (ISO/IEC Draft International Standard 13714). The standard requires the use of a control function available on the ***** key.

In addition, the flexible menu structure allows you to assign:

- Any function to any menu
- Any DTMF key to any function on any menu

You can enforce one or more of the following when a new subscriber first calls in:

- The subscriber must change the password
- The subscriber must record an audio name
- The subscriber must record and select a greeting

You can provide three different logon methods:

- Prompt for mailbox number and password.
- Use the mailbox number passed from another application and prompt for the password only.
- Use both the mailbox number and the password passed from another application that has already done its own authorization.

  If the switch supports logging-on to the telephone with a security code, or the users are **Residential** subscribers or mobile phone users who need no further authorization other than having called from their own phone, you can allow subscribers to access their mail without entering a mailbox number or password.

You can customize the help that is available on all menus, and you can assign any single key to access it from each menu (if the ISO-compliant key combination ***0** is unacceptable).

You can customize Message Center to provide:

- Message notification, using the message waiting indicator if your switch supports this
- Statistics and accounting

You can use custom servers to provide external interfaces to:

- Electronic mail (e-mail) and fax

what Message Center offers system administrators

- Pager notification applications
- Other applications, such as accounting systems

As we've already seen, you can customize Message Center to be anything, from a basic voice mail system to the hub of a fully-integrated enterprise mail system.

Support and education

Before implementing Message Center, you need to plan for:

- Supporting the users
- Educating the users
- Planning for IBM support
- Educating the system implementer

Supporting the users

In a small organization, one system administrator may be able to provide day-to-day subscriber administration, as well as being the help line. In a larger organization, you may need more system administrators and a specialized help line.

Message Center can be managed from a graphical display, using X-windows menu interfaces, or from an ASCII display, using ASCII menu interfaces and some additional command-line utilities. You can use either of these methods or both. You should decide which interface, graphical or ASCII, the system administrators are going to use, and whether you need to order additional graphical displays for them. See *DirectTalk for AIX: General Information and Planning* for more information.

Educating the users

If you have decided to implement Message Center in a large organization, you can start planning the documentation and education necessary for subscribers, and, in some cases, callers.

1. Decide what type of documentation and training you need and who is to develop and print the documentation and training materials:

   - Consider whether the documentation and training should be separate from, or integrated with, other telephone-related or systems-related documentation and training.
   - Consider the management guidance you ought to include. Does your organization have a telephone-use policy? Is there a recommended greeting format that subscribers should use? Do you need to develop such a policy if voice messaging is new in your organization?
   - Consider using the *IBM Message Center for DirectTalk: Subscriber's Guide* and the appropriate *Quick Reference* cards as the basis for your own guide for users. By tailoring the relevant information for the subscriber types in your organization, you can create your own personalized set of Message Center information.
   - Consider using the chapter, "Subscriber Administration", in the *IBM Message Center for DirectTalk: Administrator's Guide* as a system administrator's guide.

2. Decide whether you need to inform regular callers about the voice messaging system by producing a leaflet or card, or leave it to subscribers to inform callers on an informal basis.

3. In a large organization, run a 'teach the teachers' course.

4. Develop and run education sessions for your subscribers, and possibly for staff running a help line. Make sure that you provide education at the right time: before implementation, but not too long before. Back up the education by providing documentation to take away.

Planning for IBM support

Nominate a single point of contact for support. This person should know what information to give when calling for help. See "Before you call IBM support" in *DirectTalk for AIX: Problem Determination*.

You should also plan to provide a fast modem or a TCP/IP link so that you can send files to and receive files from IBM Support.

Backing up your system

You should back up information on your Message Center system on a regular basis. For information about what to back up and how to do it, see the *IBM Message Center for DirectTalk: Administrator's Guide*.

Chapter 3. Planning for Message Center

This chapter is for the person responsible for implementing Message Center. Implementing Message Center involves installing the voice application, and then integrating it with your telephone system and defining *mailboxes* for users. If the supplied application does not meet your requirements exactly, you can customize it. To understand the information in this chapter, you need to know rather more about DirectTalk, AIX, and telephony than you do for the rest of this book.

Before you start to install, integrate, and customize Message Center, you need to consider:

- Whether to run Message Center on a stand-alone or single system image (SSI) DirectTalk system
- The hardware and software requirements associated with the Message Center options (Fax, E-mail and Text-to-Speech))
- Requirements for World Wide Web access
- Requirements for WAP access
- The telephony environment and the capabilities of the switch
- The capacity of your Message Center system

We deal with the system setup first, starting with "Stand-alone or single system image (SSI)?" below. Then we look at the telephony environment in "The telephony environment and the capabilities of the switch" on page 62. This is followed by "Message Center system planning" on page 67.

Notes:

1. Above all other requirements, Message Center requires a particular base level of DirectTalk:
   - IBM DirectTalk for AIX Version 2 Release 2
2. If you are an existing user of IBM DirectTalkMail or Message Center, you'll want to know about migrating to IBM Message Center. "Migrating to IBM Message Center for DirectTalk" on page 70 gives an overview; you'll find detailed information in the chapter, "If You've Used IBM Message Center for DirectTalk or DirectTalkMail Before...", in the *IBM Message Center for DirectTalk: Administrator's Guide*.

Stand-alone or single system image (SSI)?

Whether you use Message Center in a stand-alone or SSI environment depends on your system setup, and your requirements for voice messaging services.

In this section, we describe stand-alone and SSI systems, then discuss what you should consider when choosing the appropriate setup for your requirements.

A stand-alone DirectTalk system

A stand-alone DirectTalk system has DirectTalk, the telephony connection, the application data, and the voice mailboxes and messages all installed on the same

stand-alone or single system image

RS/6000. If you want to create an additional system, you must install all these items on a new stand-alone system. Figure 13 shows a stand-alone DirectTalk system. The system is not connected to any other DirectTalk systems. The data it uses, both application data and voice mailboxes and messages, is stored on the same RS/6000 as DirectTalk.
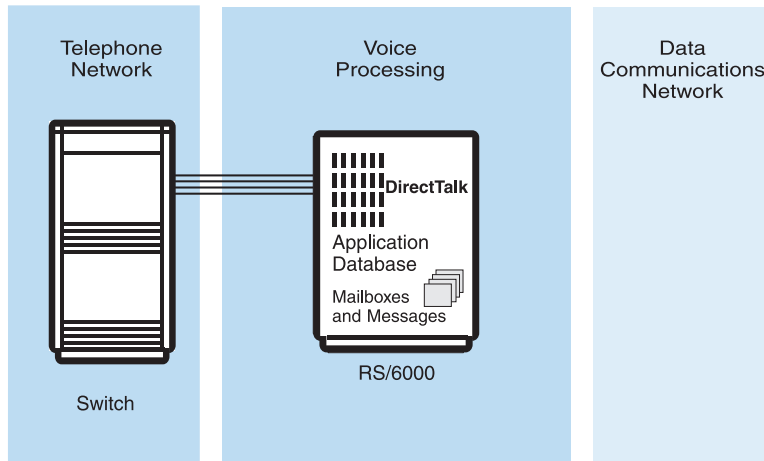
Figure 13. A stand-alone DirectTalk system

A single system image (SSI) DirectTalk system

You can connect together a cluster of DirectTalk systems using a local area network. All the systems can then share all the application data in the cluster (such as state tables and custom servers) and all the voice data (such as voice segments and voice messages). When the systems are connected in this way, you can install Message Center server option on the server system in the cluster. It is then available on all the systems that have the client option installed. Any changes you make on the server system are automatically reflected on the client systems. This means that, as your business grows, you can add more systems with little additional work.

The cluster of DirectTalk systems is known as a *single system image (SSI)*.

You'll find a detailed description of SSI systems in *DirectTalk for AIX: General Information and Planning*. The rest of this section provides an overview of SSI systems, and points you to detailed information on migrating to an SSI system in the *IBM Message Center for DirectTalk: Administrator's Guide*.

Systems in an SSI cluster

Each system in an SSI cluster is known as a *node*. Each node is configured either as a client or as a server:

Client node

A client node handles the interactions with callers. It runs DirectTalk (configured as a client), and it must be connected to your telephony

environment. A client node contains no application data: it gets this from the server, to which it is connected by a local area network.

Database server node

The database server node contains the application object database. This is a DB2® database that contains all the state tables and prompts that all the DirectTalk systems in the single system image can use, together with information about the custom servers that are installed. The server node has DirectTalk installed, configured as a server. You can add a connection to your telephony environment, if you want the server node to handle interactions with some callers.

This is the node where applications, mailboxes, and all data about the mailboxes are stored.

Voice server node

A voice server node contains the voice data for all the voice applications that run on the single system image. It also contains the program files for the custom servers that are installed on the single system image. The node stores its information in an AIX file system. This node need not have DirectTalk installed, unless you want it to handle interactions with some callers; in this case, the node must also have a connection to your telephony environment.

This is the node where voice messages are stored.

The database server and the voice server will usually be the same RS/6000, but you can install them on to two separate systems if you are creating a large single system image and you want to spread the processing load across two RS/6000s.

The nodes of a single system image must be connected together using a local area network. The type of network you use depends on the size of the voice solution you are implementing. For a large cluster, such as that needed for a voice messaging service, you might require a network providing high capacity and performance, such as an asynchronous transfer mode (ATM) network.

Examples of SSI systems

Figure 14 on page 54 shows a small single system image. Each of the clients has 4 trunks of telephony, and the server has two trunks installed. However, you do not have to install telephony components on the server. The single system image shown in the figure is suitable for running a medium-sized voice messaging service.

stand-alone or single system image
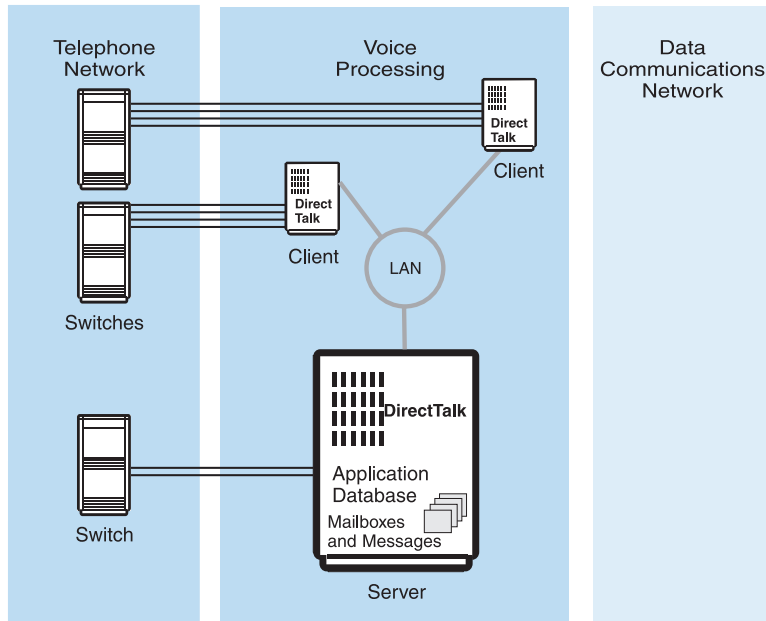
Figure 14. A small single system image

Figure 15 on page 55 shows a larger single system image. This configuration has more clients installed and there are no telephony components on the server. This configuration is suitable for a large voice messaging system, and it is likely that the server will perform no functions other than to serve the DirectTalk single system image. The clients shown in Figure 15 on page 55 can be any combination of Micro Channel RS/6000s (using DTAs and DTDAs) and PCI RS/6000s (using DTQAs and DTXAs).

A system such as that shown in Figure 15 on page 55 lets subscribers and callers access mailboxes from any client.
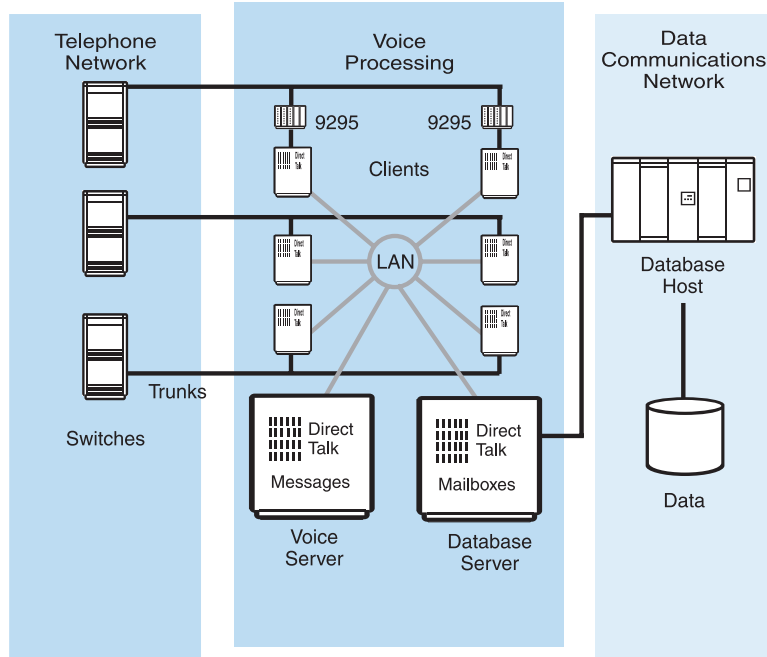
Figure 15. A large single system image

You'll find a general description of migrating to a single system image in "Migrating to a single system image" on page 71. For a detailed description of how to do it, see the *IBM Message Center for DirectTalk: Administrator's Guide*.

Choosing what's appropriate for you

Whether you decide to use the single system image architecture available in DirectTalk depends on several factors:

Critical Business Operations

For critical business operations, the impact caused by the loss of voice mail through loss of power, flood, or other major disaster, could be offset by causing a network of stand-alone systems communicating with each other using VPIM or DTM-D, for example. A disaster on one system will still allow subscribers of other systems to retrieve their mail. Furthermore, if calls for the unavailable system can be rerouted, callers might still be able to leave messages for subscribers on that system. The mail could be stored as VPIM messages until the unavailable system comes up again.

In a single system image cluster, a single system image client can fail, while the cluster remains operational. However, the single system image server still provides a central point of failure unless you protect it from such a central failure using AIX's *High Availability Cluster Multiprocessing* (HACMP) or other high availability strategies.

Size of your system

If your system is intended only for a few hundred users, or you estimate that traffic will never reach or exceed the number of lines that you can install on a stand-alone system, you may not be interested in a single system image cluster.

However, if traffic is likely to reach or exceed the number of lines that you can install on a stand-alone system, or your system is intended for many thousands of users, you are likely to need a single system image just to cope with the traffic, and are likely to benefit from the improved performance that the distribution of processing in a single system image cluster provides.

Ease of maintaining and upgrading your system

In a single system image cluster, the client nodes can often be upgraded with fixes without severely impacting your callers, as other client nodes are still available to take calls. (The instructions on the PTF package will tell you if this is possible for that PTF.)

Similarly, you can remove client nodes or add new ones while other client nodes are still running and taking calls. This gives you more flexibility and control over maintaining and upgrading your systems than is possible on stand-alone systems.

Specialized functions on different systems

Your decision between stand-alone and SSI might depend on whether you want to provide different functions to different users. For example, if you want to provide fax capabilities to only some of your subscribers, it may be economical to run a stand-alone system with the fax capabilities rather than install the fax hardware and software on all client nodes in a single system image cluster.

If you have a single system image it is best to make all client nodes as similar to each other as possible in terms of their installed hardware and software. This avoids the situation of services available on one client node being unavailable on another.

Cost of your system

A single system image cluster contains more hardware and software, and is therefore a more expensive option than a stand-alone system.

High Availability Cluster Multiprocessing

Message Center can be deployed in a HACMP configuration. If high availability for all callers and subscribers is essential, a single system image cluster with a HACMP server may provide your best insurance against failure. This configuration will have a redundant SSI data base server to take over the shared voice application and voice database for improved system redundancy. Contact your IBM representative if you are interested in configuring HACMP on your DirectTalk single system image server.

Message Center options and their requirements

You order Message Center, and receive a license for using it, according to how many mailboxes you want. You can also select the level of mailbox option you want:

1. Messaging mailbox (the basic version of Message Center)
2. Fax mailbox enablement (adds fax handling)
3. e-mail mailbox enablement (adds IMAP4-compliant e-mail handling)

For each fax or e-mail option you want, you need a messaging mailbox.

The table that follows summarizes the mailbox solutions you can set up using Message Center. The first two rows show the basic solutions - those where all messages are stored in the Message Center database. In the advanced solutions that follow, some of the messages may be stored in the Message Center messaging database, while others may be stored on an e-mail server.

Table 5. Message Center solutions

Solution Needed	Messaging Mailbox?	Fax mailbox option?	Fax server?	e-mail mailbox option?	e-mail server?
Basic voice mail or voice messaging	Yes	No	No	No	No
Basic voice mail or voice messaging with fax	Yes	Yes	Yes	No	No
Voice messaging with SMTP/MIME e-mail integration.	Yes	No	No	No	Yes
Voice messaging and fax with SMTP/MIME e-mail integration.	Yes	Yes	Yes	No	Yes
Unified messaging using IMAP4 or POP3 protocol between Message Center and e-mail.	Yes	No	No	Yes	Yes
Unified messaging, including fax, using IMAP4 or POP3 protocols between Message Center and e-mail.	Yes	Yes	Yes	Yes	Yes

What you need with Fax mailbox enablement

If you choose to purchase Fax mailbox enablement, you'll also need a fax server solution that supports sending and receiving faxes in .TIFF/F format. You can:

- Customize a fax server to work with Message Center. (Refer to your IBM representative or business partner, for further information).

Message Center options and their requirements

• Use the fax processing adapter card, firmware, BTBIOS, Bfv interface layer and associated software and drivers supplied by Brooktrout Technology Inc. You can use this solution without customizing the fax server.

Figure 16 shows the kind of setup you need when using a fax server either with a local fax server or with a remote server connected through a LAN.
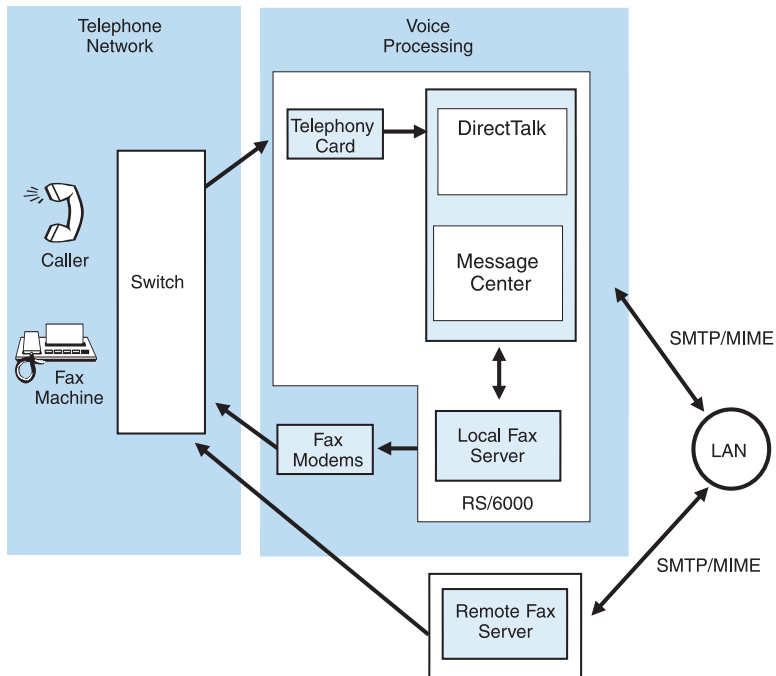
Figure 16. Local and remote fax server setup

Figure 17 on page 59 shows the kind of setup you need when using an integral fax server with the DSP Resource Adapter.
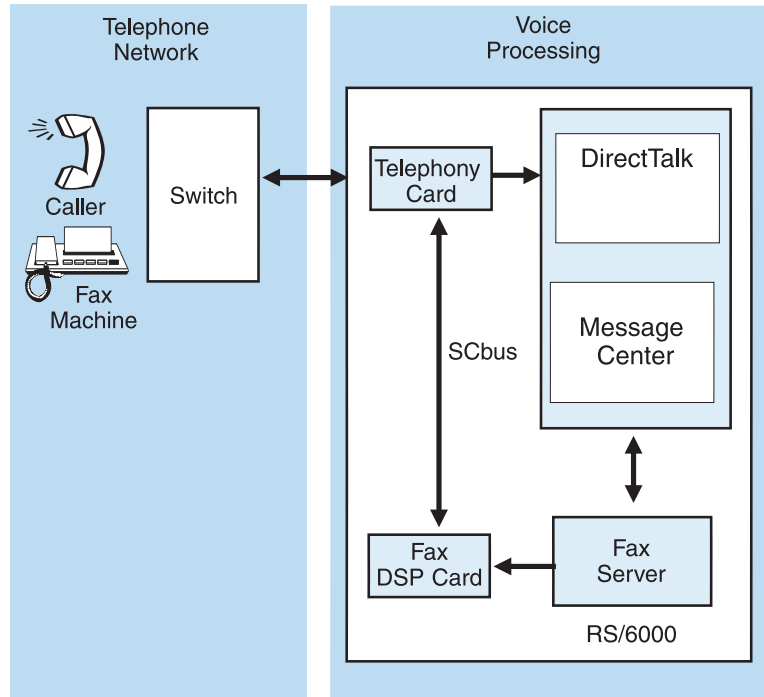
Figure 17. Fax setup with an integral fax server

For a detailed account of using fax, see the chapter "Fax applications" in *DirectTalk for AIX: Designing and Managing Applications*.

For information on restrictions on the use of adapters with Fax mailbox enablement, see "Adapters supported with the Fax mailbox option" below. For further details on the pricing or specification of the Fax Server services offering contact your IBM representative.

Adapters supported with the Fax mailbox option

IBM offers a fax solution incorporating a fax card manufactured by Brooktrout Technology Inc. which can be integrated into Message Center without any user programming. IBM supplies the custom server, state tables and all other Direct Talk components required to support the use of the Brooktrout fax server solution for faxes in .TIFF/F format.

If you install the Fax mailbox option, and use it with the Fax server solution and IBM ARTIC960Hx PCI DSP adapter, you cannot use Micro Channel systems, because the adapters required only support PCI. The PCI systems supported depend on which systems each of the PCI adapters supports, as described in Table 6 on page 60.

Message Center options and their requirements

Table 6. PCI adapters supported with fax

Machine Type/ Adapter Type	7025-F50	7026-H50	7025-H70	7026-F80	7026-H80	7044-150	7044-260	7044-270
DTXA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Brooktrout TR114	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

What you need with e-mail mailbox enablement

If you want to use Message Center to process e-mails, you need to set your system up accordingly:

- If you're using Voice Protocol for Internet Mail (VPIM), you need a Simple Mail Transfer Protocol/Multipurpose Internet Mail Extensions (SMTP/MIME) server. See "SMTP/MIME and VPIM" on page 32 for an introduction to setting this up.
- If you're using IMAP4, you need to set up two links:
  - From the IMAP4 client to Message Center so that subscribers can access voice and fax and manage their messages
  - From the client to a remote IMAP4-compliant e-mail server so that subscribers can access their e-mail

You might also need a RealAudio encoder; see the *IBM Message Center for DirectTalk: Administrator's Guide* for information on obtaining one and setting it up.

Figure 18 shows the setup for e-mail, fax, and voice mail retrieval and management controlled by an IMAP4 e-mail client.
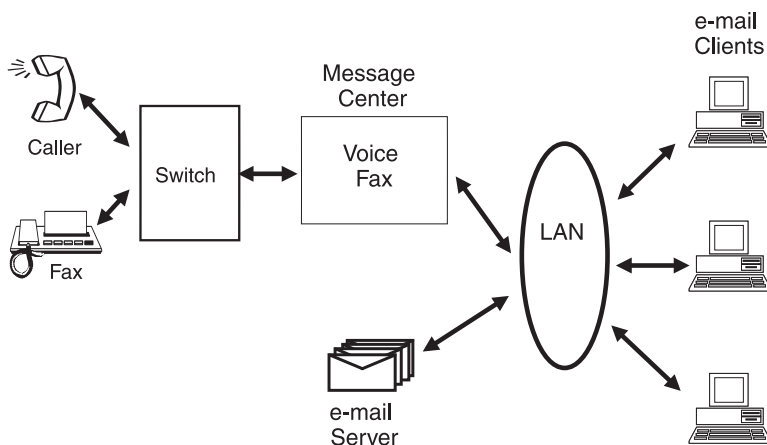
Figure 18. IMAP4 e-mail client setup

Figure 19 shows the IMAP4 e-mail server setup for e-mail retrieval and management controlled by telephone and Web interfaces.
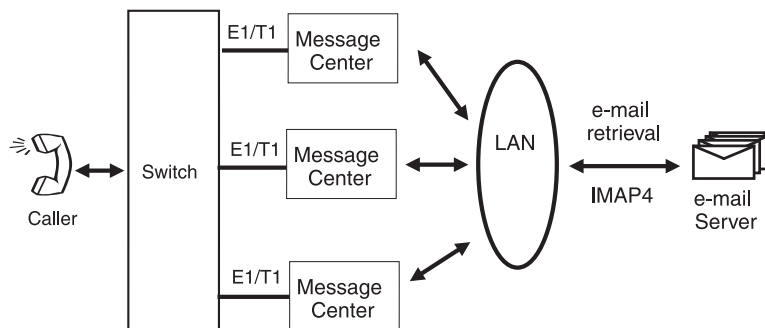
Figure 19. IMAP4 e-mail server setup

Text-to-Speech

Text-to-Speech (TTS) conversion may be deployed with Message Center to convert e-mail information to speech which can be heard over the telephone. Consult your IBM representative for further information.

Setting up World Wide Web access to Message Center

To provide your subscribers with a visual user interface to Message Center, using a World Wide Web browser such as Internet Explorer, you must have access to a World Wide Web server that supports the following:

- Java Servlets 2.2 or later
- Java Server Pages (JSP) 1.1 or later

You also need to have installed either Java Development Kit 1.1.8 (or later) or Java Runtime Environment 1.1.8 (or later). The following extensions are needed (all of which should be referenced in the $CLASSPATH environment variable):

- Java Mail 1.2 (required jar files: `imap.jar`; `mail.jar`; `mailapi.jar`; `pop3.jar`; `smtp.jar`)

  `http://java.sun.com/products/javamail`

- Java Activation Framework (JAF) 1.01 (required jar file: activation.jar)

  `http://java.sun.com/products/javabeans/glasgow/jaf.html`

- Java Naming and Directory Interface (JNDI) 1.2.1 (required jar file: jndi.jar)

  `http://java.sun.com/products/jndi/index.html`

- LDAP 1.2.2 (required jar files: jaas.jar, ldapbp.jar, ldap.jar, providerutil.jar))

  `http://java.sun.com/products/jndi/index.html`

Setting up WAP access to Message Center

To be able to provide your subscribers with a WAP interface to Message Center, you need to satisfy the following:

- Your Web server must support WML 1.2
- Your Web server must be connected to a WAP gateway via a TCP/IP connection
- The same requirements for Java Servlets, JSP, Java Mail, JAF and JNDI for World Wide Web access also apply.

The telephony environment and the capabilities of the switch

Because DirectTalk works with a large variety of telephone switches and telephony protocols, it's important that you configure it to work correctly in your telephony environment. To do this, fill in the "Planning Checklist" in *DirectTalk for AIX: General Information and Planning*.

When you have installed DirectTalk, use *DirectTalk for AIX: Configuring the System* to configure the telephony environment accordingly. In most cases, you need enter only your country name and switch type and all the other configuration parameters are set automatically. In some cases, you may need to consult a switch specialist for advice.

The capabilities of the telephone switch determine:

- How to identify the caller
- How to identify the correct mailbox
- How to provide sign-on to Message Center
- How to provide call transfer
- How to provide message waiting indication

For an overview of telephony concepts, see *DirectTalk for AIX: Configuring the System*.

How to identify the caller

The *calling number* is used to identify a caller who leaves a message. If callers are also a subscribers with a mailboxes of their own, their audio names are inserted into the message header, so that the recipient knows who left the message. The audio name specially recorded for external callers (″an external caller″) is used for any unknown callers.

In a transaction-related voice message, the transaction identifier should be passed to Message Center instead of the calling number.

How to identify the correct mailbox

The *called number* is fundamental to the operation of Message Center. This is the number that identifies each mailbox. It's known as the called number because, in a *direct inward dialing* (DID) system, it is convenient to use the number that callers dial to reach each subscriber.

Typically, a caller dials a subscriber's phone number and either the subscriber answers the call or Message Center answers it instead. When Message Center answers, it uses the called number to identify the mailbox assigned to the subscriber. See Figure 20 which shows how DID is handled. The mailbox is defined to DirectTalk by an *application profile* with the subscriber's phone number as the profile ID.

Using the called number to identify the mailbox

If your DirectTalk system is integrated with your telephone switch through an *exchange data link*, or you are using IBM CallPath®, the called number can be passed directly from the switch to Message Center.

A *voice bridge* is a device that connects the telephone switch to DirectTalk. It communicates with the switch using special protocols known to the switch, and simulates a standard exchange data link to DirectTalk. From the point of view of Message Center the voice bridge is identical to an exchange data link.

If there is a data link to your switch that is not currently supported by DirectTalk, you can write your own *signalling process* to support it. The signalling process is implemented as a custom server, written using C language subroutines. See *DirectTalk for AIX: Programming for the Signalling Interface* for details.
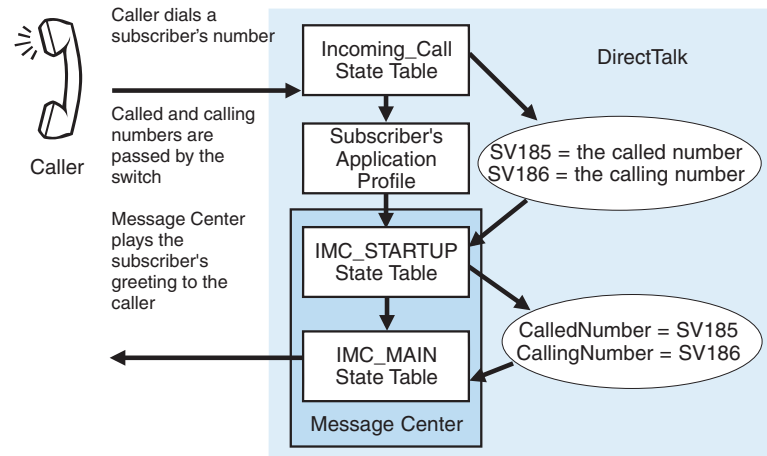
Figure 20. A caller reaches a subscriber's mailbox using direct inward dialing

Asking the caller to identify the mailbox

If direct inward dialing (DID) is not available or if, for some other reason, the called number cannot automatically be passed from the switch to Message Center, callers must be asked to identify the subscribers required:

- Your switchboard operator can pass an incoming call to Message Center. Just before call transfer, the operator can supply the called number to Message Center using DTMF (Dual Tone Multi-Frequency) tones.

- An *auto-attendant* voice application can answer incoming calls and ask the caller for the number they want. If the auto-attendant is unable to connect the caller to that number, it passes the called number to Message Center, which plays the subscriber's greeting. See Figure 21 which shows how a caller reaches a subscriber's mailbox using an auto-attendant

  Message Center includes a sample auto-attendant that you can use unchanged or customize to match your requirements.

  The supplied auto-attendant asks for the called number (the mailbox number) and calling number, but you can easily change it to ask only for the mailbox number.
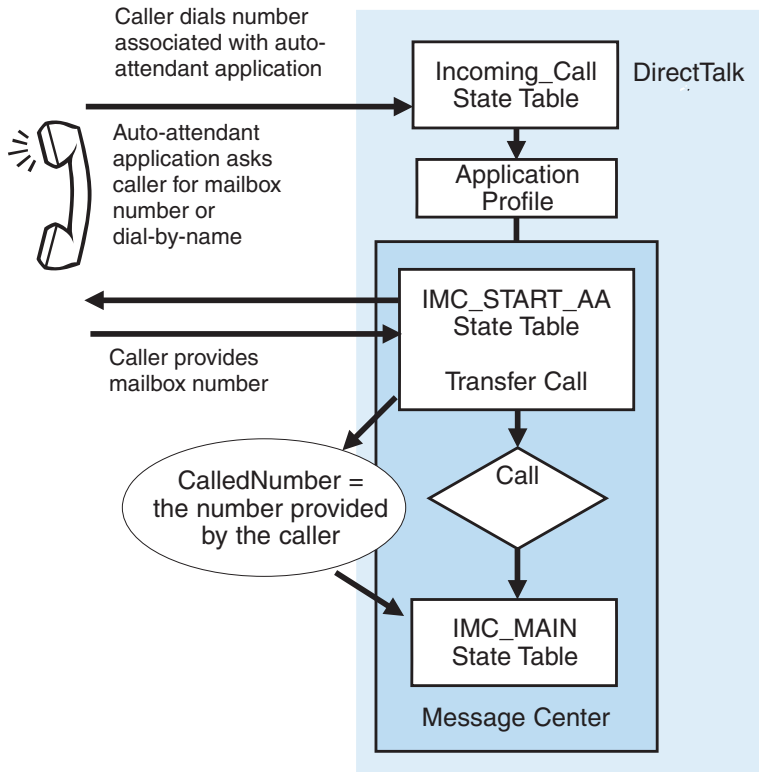
Figure 21. A caller reaches a subscriber's mailbox using an auto-attendant

Mixing DID and auto-attendant

You can mix the two ways of identifying the mailbox. If you can't get the called number when the call origin is external, because you don't have DID, but you can get the called number when the call origin is internal, you can have two start-up state tables, as shown in Figure 22 on page 65.
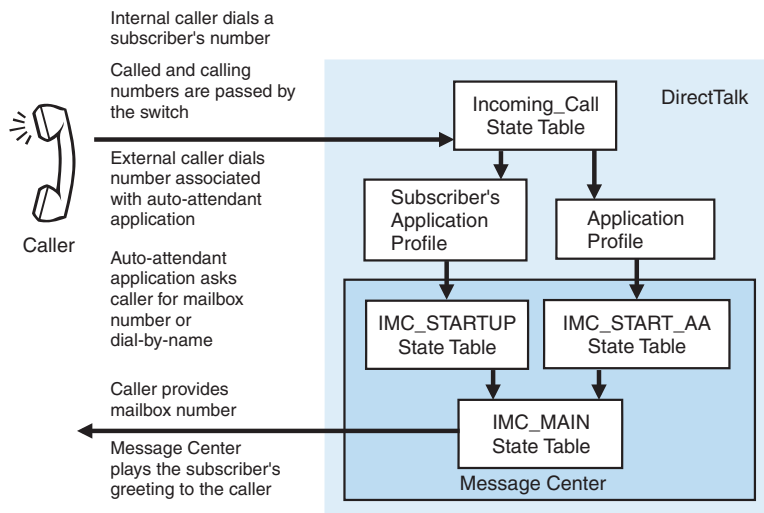
Figure 22. A mixed DID and auto-attendant system

Integrated transaction and voice messaging application

In an integrated transaction and voice messaging application, the called number can be any number that identifies a mailbox; it need not be an actual phone number. The calling application supplies the called number. For example, a banking application might have different numbers for recording:

- Change-of-address
- Complaints
- Special instructions
- Personal messages for the manager

The application passes the number to Message Center, which stores the message in the associated mailbox.

How to provide sign-on to Message Center

To sign on to Message Center in a direct inward dialing (DID) system, subscribers dial the phone number allocated to Message Center itself. There is an application profile with Message Center's phone number as the profile ID.

If direct inward dialing (DID) is not available or if, for some other reason, the called number cannot automatically be passed from the switch to Message Center, subscribers must specify that they want to sign on to Message Center by some other means: either by speaking to an operator or by interacting with an auto-attendant.

How to provide call transfer

The following functions depend on the use of some form of call transfer:

telephony environment and switch capabilities

- Transferring out of a greeting to the operator, the subscriber's assistant number, or to another extension
- Calling the sender of a message
- Forwarding incoming calls to another number
- Explicitly transferring to another extension

The ability to transfer can be provided either by the switch to which DirectTalk is connected, or by DirectTalk ability to *trombone* calls on the DTQA and DTXA trunk adapters. Tromboning calls means connecting the voice channel of an inbound call with the voice channel of an outbound call.

Using DirectTalk trombone capability lets Message Center provide more flexibility in what happens after a transfer. The caller can transfer a call, then optionally return to exactly where they were in the Message Center menus when the call transfer finishes. This can be particularly useful for a subscriber who, while working with messages, wants to speak to the sender of a message and then return to working with the rest of the messages.

If you want to use the trombone feature, it is important to bear in mind that, when the call is transferred, and throughout the entire call, two DirectTalk channels are in use. (In a switch transfer, the single channel performing the transfer is released). This can increase the use of DirectTalk channels considerably, and you may need many more DirectTalk channels to support your Message Center installation.

Chapter 1 of the *IBM Message Center for DirectTalk: Administrator's Guide* includes instructions on implementing the type of call transfer you want.

How to provide message waiting indication

The method of providing *message waiting indication* (MWI) can vary from switch to switch. DirectTalk can set message waiting: to enable this, set the MWI Automatically Set system parameter in the Exchange Data Link parameter group. For information on DirectTalk system parameters see *DirectTalk for AIX: Configuring the System*. Alternatively, you can customize your Message Center system to provide message waiting indications for your local environment. Some options are:

- Message-waiting light or special dial tone on a telephone handset, set by dialing a feature code
- Interface to an e-mail system
- Interface to alphanumeric or tone pager

Additional data can be provided with some forms of MWI. For example, an e-mail note or a pager message might contain a summary of the number of new and saved messages in the subscriber's voice mailbox.

You should have a clear plan for how MWI will be achieved in your environment before installing Message Center.

Message Center system planning

This section deals with various aspects of planning for a Message Center system:

- "Message Center capacity planning"
- "Calculating the telephony traffic" on page 68
- "Checking your system setup" on page 69
- "Migrating to IBM Message Center for DirectTalk" on page 70
- "Migrating to a single system image" on page 71

Message Center capacity planning

The following questions help you to estimate the capacity of your Message Center system. If you are also planning for text-to-speech and Web interface access, then a more detailed sizing needs to be taken. Contact your IBM Sales Representative for further assistance. You need to consider the following:

On the Message Center system...

How many subscriber mailboxes do you need?

What's the maximum number of messages that the mailboxes can store (the maximum messages per mailbox multiplied by the number of mailboxes)?

Is Message Center the only application running on the DirectTalk system?

If not, what percentage of the calls are for Message Center?

What percentage of calls are voice mail and what percentage of calls are text-to-speech calls?

For each Message Center subscriber, what is the...

Average number of voice, fax and e-mail messages present in the mailbox at any time?

Average length, in seconds, of voice mail messages?

Average number of calls made by subscribers per day into the mailbox?

Average amount of time, in seconds, that a subscriber spends accessing the mailbox? This includes navigating round the menus as well as listening to messages, sending faxes to be printed, and so on.

Proportion of incoming calls handled in the busiest hour of the working day (the *busy hour*)? This refers to subscribers accessing their mailboxes.

Maximum *blocking rate* of subscriber calls in the busy hour? (The percentage of subscribers who get the busy tone.)

For Message Center callers, what is the...

Average number of callers per day to the mailbox?

Average duration of each call? This is the average of people actually leaving a message and those who listen only to the initial voice mail message.

Proportion of callers who ring up during the busy hour?

Maximum blocking rate of caller calls in the busy hour? (The percentage of callers who get the busy tone.)

With this information you can calculate the telephony traffic and the maximum storage needed for the whole system, as described in "Calculating the telephony traffic" below.

Calculating the telephony traffic

To calculate the telephony traffic, refer to the *DirectTalk for AIX: General Information and Planning* section on "Estimating telephony traffic". You need two parameters:

c   the number of busy hour calls

t   the length of each call in seconds

The traffic in erlangs is ($c \times t / 3600$).

You'll find the erlang lookup tables in the "Estimating Telephony Traffic" section of *DirectTalk for AIX: General Information and Planning*.

Subscriber traffic
For subscriber traffic:

c   is the average number of calls made by subscribers per day, multiplied by the proportion of incoming calls handled in the busy hour, multiplied by the total number of mailboxes.

t   is the average amount of time, in seconds, that subscribers spend accessing their mailboxes.

For example, for a voice messaging system with a total of 10 000 mailboxes, where there is an average of 3 queries per day to a mailbox, and 20% of the queries are during the busy hour:

```
c = 3 x 0.2 x 10000 = 6000
```

If the average time spent accessing the mailbox is 60 seconds, t = 60, so:

```
erlangs = (6000 x 60) / 3600 = 100
```

Caller traffic
For caller traffic:

c   is the average number of callers per day to the mailbox, multiplied by the proportion of callers who ring during the busy hour, multiplied by the total number of mailboxes.

t   is the average amount of time, in seconds, that a caller spends leaving a message in the mailbox.

Calculating the total number of channels you need
The total number of channels required is:

- The number of channels required for the subscriber traffic at the blocking rate specified for subscriber calls, plus
- the number of channels required for the caller traffic at the blocking rate specified for caller calls.

Checking your system setup
Apart from the capacity of your Message Center system, there are some basic things that you need to check before considering installing Message Center:

Do you have the appropriate RS/6000?
Consult your IBM representative to agree the type of machines best suited to your environment, and the number of these machines required to handle the number of mailboxes and channels you need.

How much disk space do you need?
Determine the amount of disk space required on the RS/6000 system:

1. *DirectTalk for AIX: Installation* tells you how to calculate the space required for DirectTalk and other associated licensed programs. For the Message Center system and its files, you need at least an additional 50 megabytes.

2. Determine the space needed for voice messages by estimating the average number of messages per mailbox and the average length of a message. The messages, together with the greetings and audio names recorded by subscribers, are stored as *compressed voice data*. Each second of voice data occupies 1600 bytes. This means that you need 5 760 000 bytes to store an hour of voice data.

   For example:

   - 1200 subscribers, with an average of four messages each and an average message length of 30 seconds, have a total of 40 hours of voice data, which requires 230MB of storage space.

3. Although the average number of voice messages calculated in step 2 above may give a guideline for the *minimum* storage requirements, you will need, in addition, at least enough storage space for a day's worth of new messages. If in doubt, try to allow too much rather than hope that the minimum will be enough.

Refer to *DirectTalk for AIX: General Information and Planning* in the "Memory and storage planning" section for more information

What level of DirectTalk telephone connectivity do you need?
Refer to *DirectTalk for AIX: General Information and Planning* for the checklist on "Telephony connectivity".

What other voice applications will you use?
Refer to *DirectTalk for AIX: General Information and Planning* for the checklist on "Voice applications".

What data communications setup do you need?
Refer to *DirectTalk for AIX: General Information and Planning* for the checklist on "Data communications".

Migrating to IBM Message Center for DirectTalk

You can migrate between versions of IBM DirectTalkMail and IBM Message Center for DirectTalk. You save the DirectTalkMail version, and import it into the new software release, then apply any or all of the migration utilities described below. The table below describes what migration paths we support.

Table 7. Message Center migration paths

From	To
DirectTalkMail for AIX Version 2 (RPQ's 5799 GEX or GFF) on DirectTalk for AIX Version 2.2	IBM Message Center for DirectTalk on DirectTalk for AIX Version 2.2

Note: To migrate from the DirectTalkMail feature on DirectTalk/6000 Version 1, to IBM Message Center for DirectTalk Version 6.4 on DirectTalk for AIX Version 2.2, you must apply for a special bid via your IBM representative.

If you have extensive local modifications, make sure that they are applied to your new version of Message Center by an experienced developer or an IBM Business Partner.

Message Center provides three utilities to help you migrate data from DirectTalkMail:

1. A custom server to migrate user profiles

2. A utility to convert distribution list names

3. A utility to convert remote system names and data

You'll find detailed information about these utilities, and a description of the enhancements in IBM Message Center for DirectTalk , in the chapter, "If You've Used IBM Message Center for DirectTalk or DirectTalkMail Before...", in the *IBM Message Center for DirectTalk: Administrator's Guide*.

Migrating to a single system image

The *IBM Message Center for DirectTalk: Administrator's Guide* tells you how to migrate existing DirectTalk systems to a single system image.

Briefly, you migrate all the systems to stand-alone IBM Message Center for DirectTalk systems. You then use four utilities provided by Message Center to move your data to the machine that will become the SSI server. The process is:

1. Ensure that each system in the single system image has a unique range of message IDs.
2. Back up all the voice message and mailbox data on a system before you merge systems.
3. Restore all the data.
4. Identify and fix any discrepancies with the voice messaging database created by the merge.

Fax and E-mail

For fax and e-mail loading and configuration assistance, contact your IBM representative.

Summary

This chapter has outlined the things you need to consider before installing Message Center. You should now be able to write an implementation strategy before proceeding to plan the installation process itself. Here are the main points you should take into consideration:

- Are you going to implement Message Center on a stand-alone or single system image system?
- Do you need to be able to exchange messages with other voice mail systems?
- Does your organization need to integrate voice mail with other forms of correspondence such as fax and e-mail?
- Have you tried the World Wide Web demonstrations, to see if this would work for your organization?
- Have you considered the requirements of your other voice applications for transaction-related messaging?
- Does the switch pass the called number and the calling number to DirectTalk?
- Do you need to implement an exchange data link, voice bridge, or signalling process?
- How does call transfer work on your switch?
- Do you need to limit the numbers to which subscribers can transfer?
- How does message waiting indication work on your switch? And how are you going to provide notification of new messages?
- How many subscribers are there and what functions do they require? Do they already have a voice mail system? If so, how will you migrate them to the new system?
- How many calls do the subscribers receive? How many messages are likely to be left? How many are likely to be stored? How long are they likely to be?

summary

- How many channels do you need?
- How much disk space do you need?
- Are you going to customize prompts, voice segments, or key assignments? Do you need to disable some functions? Are you going to use multiple languages?
- Are you going to order more documentation for your users and/or write your own? How are you going to provide training for users and system administrators? Does the system implementer need to go on a training course?
- What information on your system are you going to back up? How often are you going to back it up?

Note: AIX and DirectTalk Windows provide a lot of capability to modify or interfere with the way that the system operates. Keep the RS/6000 in a lockable room. Never leave it so that unauthorized people can access or interfere with the system or mistakenly power it off.

Ensure that all passwords are non-trivial and that they are changed regularly. Whenever the system is left unattended, log off from DirectTalk, close the DirectTalk Welcome window (this leaves the run-time system active), or use a password-controlled screen lock.

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Glossary

The following terms and abbreviations are defined as they are used in the context of Message Center. You'll find a more complete glossary of DirectTalk terms in any of the DirectTalk books. If you still do not find the term or abbreviation you are looking for, see *IBM Dictionary of Computing, McGraw-Hill, 1994*, or the *IBM AIX Version 4 Topic Index and Glossary*, SC23-2513.

Numerics

6300 Digital Trunk Adapter. See Digital Trunk Adapter.

6305 Digital Trunk Dual Adapter. See Digital Trunk Dual Adapter.

6309 Digital Trunk Quad Adapter. See Digital Trunk Quad Adapter.

6310 Digital Trunk Extended Adapter. See Digital Trunk Extended Adapter.

9291 Single Digital Trunk Processor. See Single Digital Trunk Processor.

9295 Multiple Digital Trunk Processor. See Multiple Digital Trunk Processor.

A

addressee. In Message Center, the subscriber to whom a message will be sent.

administrator profile. Data that describes a DirectTalk user. Information in an administrator profile includes ID, password, language preference, and access privileges.

alarm. Any condition that DirectTalk considers worthy of documenting with an error message. Strictly speaking, the term **alarm** should include only red (immediate attention) and yellow (problem situation) conditions, but it is also used to refer to green (a red or yellow message has been cleared) and white (informational) conditions.

AMIS. See Audio Messaging Interchange Specification (AMIS).

AMIS-A. See AMIS analog.

AMIS analog (AMIS-A). The audio messaging interchange standard that specifies the use of DTMF tones to send control information, and analog signals for the message itself. It is the AMIS standard to which Message Center conforms.

analog. Data in the form of continuously variable signals, such as voice or light signals.

announcement-only greeting. In voice mail, a greeting that does not give the caller an opportunity to leave a voice message.

application. See voice application.

application connectivity link (ACL). A service that transmits out-of-band information between DirectTalk and the Siemens Hicom 300 switch.

application profile. Data that describes initial actions to be performed when the telephone is answered. Information in an application profile indicates to the channel process what state table to load.

ARTIC960RxD Quad Digital Trunk PCI Adapter. See Digital Trunk Quad Adapter.

Audio Messaging Interchange Specification (AMIS). A set of voice messaging standards designed to enable messages from different voice messaging systems to be interchanged. See also AMIS analog.

audio name. The audible name that corresponds to a specific application profile ID and mailbox.

auto-attendant. Automated attendant. A voice application that answers incoming calls and asks the caller which number or other service they would like. In Message Center, an auto-attendant can be used to access subscribers' mailboxes when direct inward dialing (DID) is unavailable.

B

base DirectTalk system.   The DirectTalk system that provides voice processing support for Message Center.

C

call.   Telephone call. Often used to mean a single runtime instance of a voice application.

call center.   A central point of front-line telephone contact between an enterprise and its customers. Contrast with contact center.

call forwarding.   The process of sending incoming calls to a telephone number other than the called number.

called number.   The number that a caller dialled. This typically identifies the mailbox that is to receive a message in a Message Center system.

called party.   Any person, device, or system that receives a telephone call. Contrast with caller.

caller.   (1) Any person, device, or system that makes a telephone call. (2) Often used to refer to any user of a voice application, even when DirectTalk has made an outbound call and the user is really the called number. (3) In Message Center, any person who makes a telephone call to a subscriber.

CallPath.   A product that provides basic computer-telephony integration (CTI) enablement and comprehensive CTI functionality. This includes access to, and management of, inbound and outbound telecommunications.

call transfer.   A series of actions that directs a call to another telephone number. See also dual-line call transfer.

CAS.   See channel associated signalling (CAS).

central office.   A telephone switching system that resides in the telephone service provider's network. There are different types of central office switches, depending upon the role of the switch within the telephone network. Commonly, a central office switch connects customer lines to other customer lines or trunks and is the point at which local subscriber lines terminate for switching to other lines or trunks.

CGI.   See Common Gateway Interface (CGI).

channel.   One of the 24 channels carried on a T1 trunk, or one of the 30 channels on an E1 trunk.

channel associated signalling (CAS).   A method of communicating telephony supervisory or line signalling (on-hook and off-hook) and address signalling on T1 and E1 digital links. The signalling information for each traffic (voice) channel is transmitted in a signalling channel permanently associated with the traffic channel.

channel bank.   A device that converts an analog line signal to a digital trunk signal.

channel number.   The identifying number assigned to a licensed channel on the T1 or E1 trunk that connects DirectTalk to the switch, channel bank, or channel service unit.

channel process (CHP).   The AIX process that executes the logic of the state table; each active caller session has one active channel process.

clear message.   A message displayed by DirectTalk to tell the operator that a red or yellow error message has been cleared.

Common Gateway Interface (CGI).   An interface to programs that provide services on the World Wide Web.

computer-telephony integration (CTI).   Connecting a computer to a telephone so that they share information and commands. Events from the computer can trigger events on the telephone system, and vice versa. The CTI connection can be on the desk top for one person or on the switch for use by many people. CTI can include simple facilities such as call transfer and screen pops, as well as more complex services, such as intelligent call routing, load balancing, and coordinating multiple call centers.

contact center.   A central point of front-line contact between an enterprise and its customers

involving more than just the telephone. Contact centers can feature automated call handling, handle both inbound and outbound customer interactions, and conduct transactions using the World Wide Web or e-mail. Contrast with call center.

CTI. See computer-telephony integration (CTI).

custom server. A C language or C++ language program that provides data manipulation and local or remote data stream, database, or other services beyond those provided by the state table interface. Custom servers provide an interface between DirectTalk and business applications, functions, or other processes to give callers access to business information and voice processing functions such as speech recognition.

D

daemon. In the AIX operating system, a program that runs unattended to perform a standard service.

dB. Decibel.

DBIM. DirectTalk's internal database manager.

DBS. DirectTalk's database server.

DDI. See direct inward dialing (DID).

development system. A DirectTalk system that is not used to respond to or make *live* calls; it is used only to develop and test applications. Contrast with production system.

dial. To initiate a telephone call. In telecommunication, this action is performed to establish a connection between a terminal and a telecommunication device over a switched line.

dial by name. To press the keys that correspond to a subscriber's name rather than their telephone number or extension.

dial tone. An audible signal (call progress tone) that indicates that a device such as a PABX or central office switch is ready to accept address information (DTMF or dial pulses).

dialed number identification service (DNIS). A number supplied by the public telephone network to identify the number actually called. For example, two toll-free numbers might both be translated to the same real number. The DNIS information distinguishes which of the two numbers was dialed. DNIS can be used by CallPath Enterprise Client or DirectTalk to automatically select between several business database applications. Often used as a synonym for called number.

DID. See direct inward dialing (DID).

digital signal processing (DSP). A set of algorithms and procedures used to process electronic signals after their conversion to digital format. Due to the specific mathematical models required to perform this processing, specialized processors are generally used.

Digital Trunk Adapter. The adapter that plugs into a Micro Channel slot on an RS/6000 to complete the connection to a multiple digital trunk processor or a single digital trunk processor. Contrast with Digital Trunk Dual Adapter, Digital Trunk Extended Adapter, and Digital Trunk Quad Adapter.

Digital Trunk Dual Adapter. The adapter that plugs into a Micro Channel slot on an RS/6000 to complete the connection to two packs in a multiple digital trunk processor or a single digital trunk processor. Contrast with Digital Trunk Adapter, Digital Trunk Extended Adapter, and Digital Trunk Quad Adapter.

Digital Trunk Extended Adapter. The IBM ARTIC960RxD Quad Digital Trunk PCI Adapter. In DirectTalk this adapter is known as a DTXA. It allows you to connect directly to the telephony network an RS/6000 unit that has a PCI bus; it doesn't need an external pack. Contrast with Digital Trunk Adapter, Digital Trunk Dual Adapter, and Digital Trunk Quad Adapter, all of which need external packs.

digital trunk processor. See Multiple Digital Trunk Processor and Single Digital Trunk Processor.

Digital Trunk Quad Adapter. An adapter that allows a Single Digital Trunk Processor or Multiple Digital Trunk Processor to be attached to an RS/6000 unit that has a PCI bus, including the model 43P and model E20. Contrast with Digital Trunk Adapter, Digital Trunk Dual Adapter, and Digital Trunk Extended Adapter.

direct dial in (DDI). See direct inward dialing (DID).

direct inward dialing (DID). A service that allows outside parties to call directly to an extension of a switch. Known in Europe as direct dial in (DDI).

DirectTalk. A voice processing system, bringing together telephone and data communications networks to use information stored in databases directly from a telephone.

DirectTalkMail. An earlier name for "Message Center" on page 80.

DirectTalkMail Digital (DTM-D). A digital protocol for exchanging voice messages very rapidly between Message Center systems.

disconnect. To hang up or terminate a call.

distribution list. In voice mail, a list of subscribers to whom the same message can be sent.

DNIS. See dialed number identification service (DNIS).

double-trunking. See trombone.

DSP. See digital signal processing (DSP).

DTA. See Digital Trunk Adapter.

DTDA. See Digital Trunk Dual Adapter.

DTM-D. See DirectTalkMail Digital (DTM-D).

DTMF. See dual-tone multifrequency (DTMF).

DTQA. See Digital Trunk Quad Adapter.

dtuser. The name of the AIX account set up during the installation process for the use of all users of DirectTalk.

DTXA. See Digital Trunk Extended Adapter.

dual-line call transfer. A call transfer method in which the primary and secondary lines remain bridged until a call is completed. (Also known as **tromboning**: see trombone).

dual-tone multifrequency (DTMF). The signal sent by pressing the telephone keys. Each signal is composed of two different tones.

dynamic caller menu. A menu that is created *on-the-fly* and presented to the caller in a mailbox. The options on that menu are dependent on (1) the greeting that the subscriber has active, and (2) the options that the subscriber has configured.

E

E1. A digital trunking facility standard used in Europe and elsewhere, capable of transmitting and receiving 30 digitized voice or data channels. Two additional channels are used for synchronization, framing, and signalling. The transmission rate is 2048 kilobits per second. Contrast with T1.

e-business. A marketplace where businesses use Internet technologies and network computing to securely transform their business processes (using intranets), their business relationships (using extranets), and the buying and selling of goods, services, and information (using electronic commerce).

EDL. See exchange data link.

erlang. The international unit of telephony traffic, named after the Danish mathematician, Agner Krarup Erlang. The erlang has a very concise meaning for mathematicians and queuing theory experts. From a more practical standpoint, the erlang is a measure of traffic intensity, where one erlang represents one circuit occupied for one hour.

error message. Any message displayed by DirectTalk in the System Monitor as an alarm and optionally written to the DirectTalk error log, or to the AIX error log. Strictly speaking, the term **error message** should include only red (immediate attention) and yellow (problem situation) messages, but it is also used to refer to green (a red or yellow message has been cleared) and white (informational) messages.

exchange data link. A serial connection that carries messaging information between DirectTalk and a switch.

external messaging. In Message Center, a system that lets subscribers send messages to, and receive messages from, subscribers on other voice mail systems.

F

File Transfer Protocol (FTP). In Transmission Control Protocol/Internet Protocol (TCP/IP), an application protocol used for transferring files to and from host computers.

FTP. See File Transfer Protocol (FTP).

G

greeting. In voice mail, the recording heard by a caller on reaching a subscriber's mailbox. See also announcement-only greeting.

greeting header. In voice mail, a recording made by a subscriber and played to callers either before or instead of a personal greeting.

H

hang up. To terminate a call. See also disconnect.

hook flash. A signal sent to a switch to request a switch feature (such as call transfer).

host application. An application residing on the host computer.

hunt group. A set of telephone lines from which a non-busy line is hunted to handle, for example, an incoming call.

I

IMAP4. See Internet Mail Access Protocol (IMAP4).

in-band. In the telephony voice channel, signals are said to be carried in-band. Contrast with out-of-band.

incoming mail. In Message Center, new messages recorded by callers or sent by subscribers.

integrated messaging. A messaging system in which more than one copy of a single message is stored, the copies being kept synchronized by the applications used to access them. Contrast with unified messaging.

Integrated Services Digital Network (ISDN). A digital end-to-end telecommunication network that supports multiple services including, but not limited to, voice and data.

interactive voice response (IVR). A computer application or telephony device that uses prerecorded voice responses to provide information in response to DTMF or voice input from a telephone caller.

Internet Mail Access Protocol (IMAP4). A standard protocol for accessing mail on an e-mail server, as defined in Internet Request for Comments (RFC) 2060.

ISDN. See Integrated Services Digital Network (ISDN).

IVR. See interactive voice response (IVR).

J

jump out. See call transfer.

K

key. One of the keys on the telephone keypad. In some contexts, the dual-tone multifrequency (DTMF) signal that corresponds to a key.

key pad. The part of the telephone that contains the push-button keys.

key pad mapping. The process of assigning special alphanumeric characters to the keys on a telephone key pad so that the telephone can be used as a computer terminal keyboard.

L

LDAP. See lightweight directory access protocol (LDAP).

licensed program product (LPP). A separately-priced program and its associated materials that bear an IBM copyright and are offered under the terms and conditions of a licensing agreement.

Lightweight Directory Access Protocol (LDAP). A standard protocol for accessing directory entries on a directory server, as defined in Internet Request for Comments (RFC) 1777.

local node. See local system.

local system. A system that forms part of the Message Center single system image (SSI). Message Center sends voice messages to, and receives voice messages from, profiles on such systems, using built-in DirectTalk functions. Contrast with remote system.

M

mailbox. In a voice mail system, the place where voice messages are stored.

mailbox number. An application profile with a profile ID that is usually the subscriber's extension number.

MB. See megabyte.

MCIT. See Message Center Interface Tool (MCIT).

megabyte. (1) For processor storage and real and virtual memory, 1 048 576 bytes. (2) For disk storage capacity and transmission rates, 1 000 000 bytes.

message attributes. In Message Center, the priority, privacy, delivery date, and acknowledgment status of a voice message.

Message Center. A unified messaging application that runs on DirectTalk for AIX.

Message Center Interface Tool (MCIT). A menu-based application used to administer a Message Center system.

message delivery preference. The subscriber's choice of whether voice mail is stored as voice mail only, as e-mail only, or as both voice mail and e-mail.

message delivery type. The format in which a voice message is delivered.

message header. In Message Center, information about the sender of a voice message and the date and time it was sent, which is usually played before the message itself.

message waiting indicator. A visible or audible indication (such as a light or a stutter tone) that a voice message is waiting to be retrieved.

Micro Channel. A bus, which conforms to the Micro Channel Architecture used in personal computers and individual workstations. This architecture defines the signals used by the various computer devices and interfaces connected to the bus.

Micro Channel Architecture. The rules that define how subsystems and adapters use the Micro Channel bus in a computer. The architecture defines the services that each subsystem can or must provide.

MIME. See Multipurpose Internet Mail Extensions (MIME).

Multiple Digital Trunk Processor. The IBM 9295 Multiple Digital Trunk Processor. The combination of a number of digital signal processing cards and supporting equipment that provides high-level voice compression, high voice quality, and digital telephone signalling functions (transmit and receive) via an external shielded cable to an attached IBM RS/6000 computer. See also Single Digital Trunk Processor.

Multipurpose Internet Mail Extensions (MIME). A protocol used on the Internet for extending e-mail capability and integrating it with other forms of communication, such as voice mail and fax.

MWI. See message waiting indicator.

N

Network File System (NFS). The AIX implementation of the Network File System product from Sun Microsystems. In a single system image (SSI), NFS is used to attach voice files and custom servers from the SSI server system.

node code. In Message Center, the numeric code that identifies remote nodes.

notification schedule. In Message Center, the specification of times and phone numbers at which the subscriber is to be notified about incoming messages. The priority of messages required to trigger a notification is also specified in the schedule.

O

off-hook. A telephone line state, usually induced by lifting a receiver, in which the line is ready to make a call.

on-hook. A telephone line state, usually induced by hanging up a receiver, in which the line is ready to receive a call.

out-of-band. Within the telephony signalling channel, as opposed to the voice channel, signals are said to be carried out-of-band. Contrast with in-band.

outgoing mail. In voice mail, messages sent by a subscriber to another subscriber on the same system, which have not yet been accessed by the addressee.

P

PABX. See private automatic branch exchange (PABX).

pack. A component that fits in the 9295 Multiple Digital Trunk Processor. See also RPACK, SPACK, and VPACK.

partition. A logical division of a Message Center system that has its own administrator and subscribers who can be isolated from other subscribers outside that partition.

partition administrator. An administrator with permission to perform subscriber administration only for a particular partition.

password. A unique string of characters known to a computer system and to a user, who must specify the character string to gain access to the system and to the information stored in it.

PBX. See private branch exchange (PBX).

PCI. See peripheral component interconnect (PCI).

peripheral component interconnect (PCI). The rules that define how subsystems and adapters use the Intel bus in a computer.

personal directory. A directory of up to ten entries that certain subscribers can maintain using a Web interface. This personal directory enables subscribers to (1) filter their remote e-mail messages based on a particular person or group of people, and (2) forward remote e-mail messages to other people listed in this directory.

personal greeting. In voice mail, a greeting recorded by a subscriber. Contrast with system greeting.

POP3. A standard protocol for accessing mail on an e-mail server, as defined in Internet Request for Comments (RFC) 1725.

private automatic branch exchange (PABX).
An automatic private switching system that
services an organization and is usually located on
a customer's premises. Often used synonymously
with private branch exchange (PBX).

private automatic branch exchange (PABX). A
switch inside a private business that concentrates
the number of inside lines into a smaller number
of outside lines (trunks). Many PBXs also provide
advanced voice and data communication features.
Often used synonymously with private automatic
branch exchange (PABX).

process a call. To answer the telephone and
perform the appropriate tasks.

production system. A system that is used to
respond to, or make, live calls. Contrast with
development system

program data. Application-specific data that can
be associated with a call transfer from CallPath to
DirectTalk , or in the opposite direction. This is
equivalent to CallPath program data, but
DirectTalk imposes the restriction that the data
must be a printable ASCII character string, with a
maximum length of 512 bytes.

program temporary fix (PTF). An update to IBM
software.

prompt. (1) A message requesting input or
providing information. Prompts are seen on the
computer display screen and heard over the
telephone. (2) In DirectTalk, a program that uses
logic to dynamically determine the voice segments
to be played as a voice prompt.

prompt directory. A list of all the prompts used
in a particular voice application. Used by the state
table to play the requested voice prompts.

protocol. A set of semantic and syntactic rules
that determines the behavior of functional units in
achieving communication.

PTF. See program temporary fix (PTF)

pushbutton. (1) A key on a telephone key pad.
(2) A component in a window that allows the user
to invoke a specific action.

pushbutton telephone. A type of telephone that
has pushbuttons. It may or may not send tone
signals. If it does, each number and symbol on the
key pad has its own specific tone.

Q

Quad Adapter. See Digital Trunk Quad Adapter

quick message number. In Message Center,
the number that callers can dial to send messages
to subscribers without ringing their phone and
without having to sign on to Message Center.

quiesce. To shut down a channel, a trunk line, or
the entire system gracefully. The shutdown is
performed on a channel-by-channel basis.
Channels in an idle state are shut down
immediately. Channels processing calls are shut
down at call completion.

R

reboot. To reset or restart the RS/6000.

reduced instruction set computer (RISC). The
system on which DirectTalk runs, specifically
referred to as an IBM RS/6000.

referral number. The phone number to which
calls are routed when call forwarding is active.

remote e-mail. E-mail stored on a separate
e-mail server rather than within the Message
Center system. In order to be accessible by
Message Center, such remote e-mail servers must
be Internet Mail Access Protocol
(IMAP4)-compliant.

remote name. A voice file for the spoken names
of profiles on a remote system.

remote node. See remote system.

remote system. Any system with which
Message Center can exchange voice messages,
including other Message Center systems and
other suppliers' voice mail systems. Contrast with
local system.

return code. A code that indicates the status of an application action when it completes.

RISC. See reduced instruction set computer (RISC).

RPACK. Resource pack. A specialized adapter card which is housed in the 9295 Multiple Digital Trunk Processor. This adapter is used for speech recognition support. Contrast with RPACK and VPACK.

S

SCbus. See Signal Computing bus (SCbus).

segment ID number. One or more numbers used to identify a voice or prompt segment.

service provider. The telephone company.

Signal Computing bus (SCbus). A time division multiplexed (TDM) hardware bus that interconnects different vendors' computer telephony adapters. Specified as part of Signal Computing System Architecture (SCSA).

Signal Computing System Architecture (SCSA). An architecture that supports the interoperability of software and hardware components developed by different vendors in the computer telephony industry.

signalling. The exchange of control information between functional parts of the system in a telecommunications network.

signalling process. A DirectTalk component that controls signalling for an exchange data link or common channel signalling protocol. Some signalling processes are supplied with DirectTalk, and others can be custom-written.

Signalling System Number 7 (SS7). A signalling protocol used to communicate between telephony equipment.

sign-on prompt. In Message Center, the prompt that asks subscribers to enter their extension number and password (heard when subscribers dial Message Center's number or select sign-on when listening to a greeting).

Simple Mail Transfer Protocol. The base TCP/IP protocol for sending and receiving e-mail.

Simplified Message Service Interface (SMSI). A protocol running on a serial connection (see exchange data link) that carries messaging information between DirectTalk and Lucent or AT&T switches.

Single Digital Trunk Processor. The IBM 9291 Single Digital Trunk Processor. The combination of a single digital signal processing card and supporting equipment that provides high-level voice compression, high voice quality, and digital telephone signalling functions (transmit and receive) via an external shielded cable to an attached IBM RS/6000 computer. The Single Digital Trunk Processor supports one T1 or E1 trunk. See also Multiple Digital Trunk Processor.

Single System Image (SSI). A cluster of DirectTalk systems that are connected together using a local area network. Each system (known as a node) in the cluster is configured as either a client or a server.

SMIT. See System Management Interface Tool (SMIT).

SMSI. See Simplified Message Service Interface (SMSI).

SMTP. See Simple Mail Transfer Protocol.

SNA. Systems Network Architecture.

SPACK. A logical component consisting of a base card, which connects to the digital trunk adapter in the RS/6000, and a trunk interface card (TIC), which manages the trunk connection to the switch. The SPACK is required to implement common channel signalling protocols, for example, SS7. Contrast with RPACK and VPACK.

special character. A character that is not alphabetic, numeric, or blank. For example, a comma (,) or an asterisk (*).

speech synthesis. The creation of an approximation to human speech by a computer concatenating basic speech parts together. See also text-to-speech technology.

glossary

SS7. See Signalling System Number 7 (SS7).

SSI. See Single System Image (SSI).

subscriber. In voice mail, any person who owns a mailbox. Contrast with caller.

subscriber class. A named set of variables used to define a specific level of service available to telephone subscribers, such as maximum number of messages per mailbox and maximum number of members per mailbox distribution list.

subscriber type. A setting for a subscriber that determines which menu options and features are available to that subscriber and to callers into that subscriber's mailbox. There are a **Standard** set of menus and options, and an additional four subscriber types: **Business - local & remote**, **Business - local**, **Remote e-mail only**, and **Residential**.

super administrator. An administrator who can create and delete partitions. This administrator can also perform subscriber administrator for any partition.

switch. A generic term used to describe a telecommunications system that provides connections between telephone lines and trunks.

system administrator. The person who controls and manages the DirectTalk system by adding users, assigning account numbers, and changing authorizations.

system greeting. In voice mail, a default greeting heard by callers to the mailboxes of subscribers who have not recorded a personal greeting or who have selected the system greeting. Contrast with personal greeting.

System Management Interface Tool (SMIT). A set of utilities that can be used for various purposes, such as loading DirectTalk software, installing the exchange data link, and defining SNA profiles.

T

T1. A digital trunking facility standard used in the United States and elsewhere, capable of transmitting and receiving 24 digitized voice or data channels. The transmission rate is 1544 Kilobits per second. Contrast with E1.

tag image file format/fax (TIFF/F). A graphic file format used to store and exchange scanned fax images.

TCP/IP. See Transmission Control Protocol/Internet Protocol (TCP/IP).

telephony portal. The use of Message Center solely for telephony. All messages and required subscriber information is retrieved from external e-mail and LDAP servers.

text-to-speech (TTS). The process by which ASCII text data is converted into synthesized speech. See also speech synthesis.

TIFF/F. See tag image file format/fax (TIFF/F).

time slot. The smallest switchable data unit on a data bus, consisting of eight consecutive bits of data. One time slot is equivalent to a data path with a bandwidth of 64 Kbps.

token-ring network. A ring network that allows unidirectional data transmission between data stations by a token-passing procedure over one transmission medium so that the transmitted data returns to the transmitting station. A token-ring network can be used as a local node for DirectTalk-to-BBN Hark Recognizer communication.

tone. An audible signal sent across a telephone network. There are single (one-frequency) tones, tritones (three sequential tones at different frequencies), dual tones (two simultaneous tones at different frequencies), and dual sequential tones. Each has a different meaning.

transaction. A specific, related set of tasks within an application that retrieve information from a file or database. For example, a request for the account balance or the available credit limit.

transaction messaging. The ability to associate an item of data, such as a transaction identifier, with a voice message. The voice message can subsequently be retrieved by referencing the data value.

transfer. See call transfer.

Transmission Control Protocol/Internet Protocol (TCP/IP). A communication subsystem that is used to establish local area and wide area networks.

trombone. A connected voice path which enters an IVR from a switch on one circuit, then returns to the same switch on a parallel circuit. Two IVR ports and two circuits are consumed, but in some circumstances this may be the only way to make a connection between two callers if the attached switch does not support a Call Transfer function. Also known as **double-trunking**.

trunk. A telephone connection between two central offices or switching devices. In DirectTalk, a trunk refers to 24 or 30 channels carried on the same T1 or E1 digital interface.

trunk interface card (TIC). The component of the VPACK that manages the trunk connection to the switch.

TTS. See text-to-speech technology.

U

unified messaging. A messaging system in which a single copy of a message is stored and accessed by multiple applications (for example, voice mail and e-mail). Contrast with integrated messaging.

user. Someone who uses Message Center as a system administrator, application developer, or similar. Contrast with caller.

V

voice application. A DirectTalk application that answers or makes calls, plays recorded voice segments to callers, and responds to the caller's input.

voice bridge. A device that connects a telephone switch to DirectTalk.

voice directory. A list of DirectTalk systems identified by a group ID. Voice directories can be referenced by prompts and state tables. Contrast with voice table.

voice mail. The capability to record, play back, distribute, and route voice messages.

voice mailbox. The repository for incoming messages for a voice mail subscriber. It may also contain data about how incoming calls or messages are to be handled. For example, it may identify the ReachMe number, notification schedules, e-mail address to which messages are to be sent, and so on.

voice message. In Message Center, a recording made by a caller for later retrieval by a subscriber.

voice messaging. The capability to record, play back, distribute, route, and manage voice recordings of telephone calls through the use of a processor, without the intervention of agents other than the callers and the message recipients.

Voice Protocol for Internet Messaging (VPIM). Standard for digital exchange of voice messages between different voice mail systems, as defined in Internet Request For Comments (RFC) 1911.

voice recognition. The capability of a computer to understand the spoken word for the purpose of receiving commands and data input from the speaker.

voice segment. The spoken words or sounds that comprise recorded voice prompts. Each segment in an application is identified by a language, a voice directory name, and a segment ID and usually includes accompanying text.

voice table. A grouping of DirectTalk systems in a table for access using an index, such as the numbers 0 to 9 or the letters A to Z. Voice tables can be referenced by prompts, but not directly by state tables. Contrast with voice directory.

VPACK. A component consisting of a base card, which connects to the digital trunk adapter in the

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RS/6000, and a trunk interface card (TIC), which manages the trunk connection to the switch. The single digital trunk processor contains one VPACK, and the multiple digital trunk processor contains slots for up to five VPACKs. Contrast with RPACK and SPACK.

VPIM.   See Voice Protocol for Internet Messaging (VPIM).

W

window.   An area of the screen with defined borders in which information is displayed. A window may be equal in size to the entire screen, or may share the screen with other windows.

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